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The Refrigeration Service Engineer

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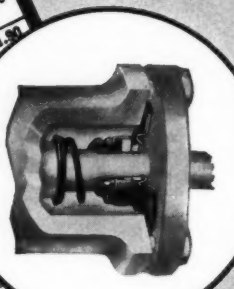

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24-hour-a-day Job *for* REFRIGERATION *and* AIR CONDITIONING

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Today there's no time for equipment shutdown. No excuse for equipment inefficiency. . . . And present equipment must be kept operating.

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We gratefully dedicate our efforts to the "24-hour-a-day" Efficiency that VICTORY requires of Refrigeration Equipment.

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You men, in particular, who service commercial refrigeration installations are called upon to do your utmost to "keep 'em running" efficiently day in, day out. And it's not a simple job, with shortages of needed materials and long delays on orders.

In support of your vital job, Penn pledges to do its utmost to supply needed controls and to furnish them with reasonable promptness. Our armed forces naturally have first call on our facilities—but we are determined to serve the needs of the refrigeration industry as fully and as promptly as possible. So... remember, you can depend on Penn again in '42 for efficient refrigeration controls.

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Drying cartridges and dehydrators are as good as their drying agents make them. Select your materials, therefore, to avoid a weak link in your refrigerant conditioning procedure. Choose Alorco Activated* Aluminas, proved to have high drying and purifying efficiency.

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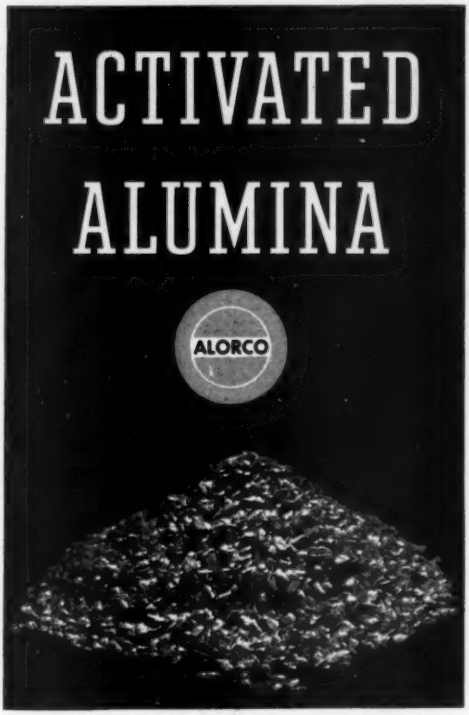

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In All Par Models!!!

PAR compressors are really engineered . . . built like a fine automobile. That's why they are equipped with 3-ring pistons . . . one oil and two compression rings. When you buy a PAR unit, you get pistons—not "plungers."

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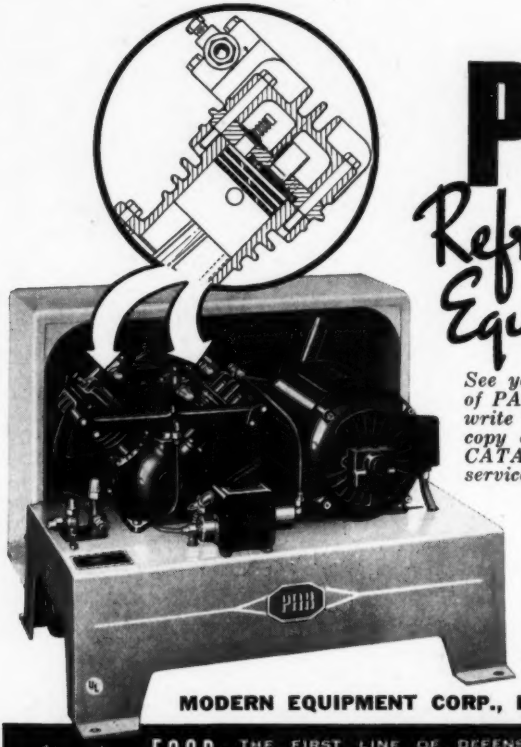

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How the fund is allocated . . . What it does in service

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The Refrigeration Service Engineer

Vol. 10 No. 2

February, 1942

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

Cover

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MANPOWER AND MATERIALS
KEYS TO NATIONAL DEFENSE
-they must be conserved

Defense requirements must come first. Demands are heavy—will be heavier—and they must be met. Hence, it is a patriotic duty to conserve manpower and materials—the twin keys to National Defense.

In laying out refrigeration and air conditioning installations, it is necessary to consider these factors. As the army grows—capable service men will be fewer—the answer is equipment that requires minimum service. If equipment is ineffective and has to be replaced, added and unnecessary loads are thrown on production machines needed for turning out military supplies. Additional materials must be used which may be needed elsewhere. Select equipment that won't have to be replaced.

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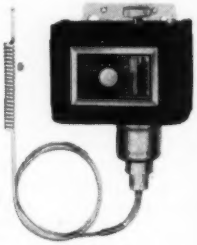

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The Refrigeration Service Engineer

Vol. 10, No. 2 CHICAGO, FEBRUARY, 1942 $2.00 Per Annum

Man the Civilian Lines

MANPOWER is among the "critical" commodities. Without question the amount of refrigeration maintenance and repair work now and in the future will have to be done with a reduction of experienced service men. How severe that shortage may be in face of increased demands is still problematical. Two factors are pertinent in this situation. First, much of the equipment due for normal replacement will have to be maintained and kept in operating condition; second, many experienced service men have been called or will be called for military service. Production and installation of refrigeration equipment has reached new highs during the past several years. This equipment must be maintained. It is clearly evident that the shortage of manpower will place a greater responsibility upon those now engaged in the service business. More must be done with less.

There is now a much greater appreciation among the civilian and military authorities of the essential nature of refrigeration, both from the standpoint of the preservation of food stuff and its application in contributing to increased production. Both of these applications are vital in our war effort. They insure the maintenance of health and morale so vital to a conclusive victory.

It has been anticipated for some time that the new repair order would be issued before this date, providing the "green light" for securing all necessary parts and repairs for all existing refrigeration equipment. Some delay was occasioned by the change in the Office of Production Management being succeeded by the War Production Board. Recent advice still indicates that the order will be available shortly which, of course, will expedite the securing of the necessary parts.

Tire Situation

The tire situation promises to be the big "bugaboo." Restrictions on new tires or retreading are severe. Few exceptions are made in the tire rationing plan. It does provide that certain essential services will be permitted this "critical" commodity, but it is specific in its provisions that the order will apply to the use of trucks only for such services. It is reasonable to expect that approximately 75% of the cars used by service men are pleasure cars and it is highly probable that many of these could be converted to light

delivery trucks to conform with the governmental regulations. Some local tire rationing boards have recognized the essential service that the refrigeration service men perform and in other localities this has not been true. It is anticipated that a definite ruling may be secured from the War Production Board on this subject.

This brings up the necessity of a stringent conservation program. In large urban communities, service companies have had to answer calls a considerable distance away from the territory of their operation. Some arrangement may be necessary whereby service calls may be interchanged to conserve material and manpower. In other words, it would seem that there is a decided advantage and a necessity, too, to prevent the duplication of effort. Such an arrangement could unquestionably be handled and we suggest that this might be a good program for the Refrigeration Service Engineers Society to adopt through its local chapter meetings.

With additional service work and restrictions that may be necessary in transportation facilities it is highly probable that customers may find service cannot be expected as prompt as formerly. In the tire order recognition has been given to essential civilian services. Among others it specifically provides that tires may be secured for ice and coal service trucks. It is evident that the government recognizes that ice companies are performing a refrigeration service vital to the community needs and it would be unreasonable to presume that the order would be discriminatory in that it would not recognize that an equally essential service is being performed by the refrigeration service and maintenance engineer. If the anticipated refrigeration repair order will carry a sufficiently high rating to secure parts, it is expected that this rating may have a bearing on the securing of tire replacements.

Prices for Carbon Tet Fixed by OPA

IN the face of a threatened shortage of materials essential to its manufacture, maximum prices for carbon tetrachloride were established in Price Schedule No. 79 issued January 29, 1942, from the Office of Price Administration, of which Leon Henderson is Administrator.

The schedule, which fixes the maximum prices for quantities of 5 gallons or more at the current level, is effective as of February 2, 1942.

In normal times, carbon tetrachloride is used widely in dry cleaning fluids, fire extinguishers, fumigants and the production of refrigerants.

The increased demand, however, is due in large measure to the use of the chemical for the cleaning of machine tools and metal parts employed in manufacture of airplane engines, military trucks, munitions and many other products.

As a result of the increased war industry effort there has been a substantially increased demand for the product. A shortage of chlorine, essential to the manufacture of carbon tetrachloride, restricts expansion in production of the latter chemical.

Producers' prices, after remaining at a level for nearly three years, were increased October 1, 1941, from the base price of 66 cents per gallon for drums in carload lots to 73 cents per gallon. Prices charged by resellers, however, have advanced in some instances to two or three times their previous levels and further price increases threatened.

After investigations and conferences with members of the industry and representatives of other Government agencies, the Office of Price Administration determined that maximum prices should be established to avert inflationary price trends in this commodity.

The maximum prices established cover four zones, with the 73 cents per gallon price (for carload lots in 50-55 gallon drums) in Zone 1, 80 cents in Zone 2, 94 cents in Zone 3 and 88 cents in Zone 4. There are differentials to cover carload lots in 5 and 10 gallon cans and for less than carload lots in both size packages. The prices apply to all deliveries in the respective zones, regardless of the zone from which shipment is made.

The zones are those used in existing practices in the industry.

Prices for export are covered in the schedule.

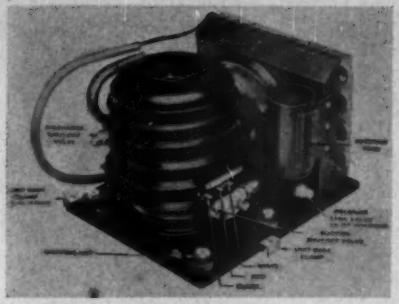


Fig. 1—The HSF-7 and HSF-8 unit made in 1937 and 1938. The HSF-7 is very similar to the first single cylinder unit charged with SO_2 and used in 1937. The 1938 unit is charged with F12.

Service Data on The Gibson Refrigerator

Including the essential service data on all Gibson units and detailed service information on those units made from 1938 to 1941.

GIBSON Refrigerating units were first placed on the market in 1931. The design of the compressor at that time was a direct driven twin cylinder opposed type charged with SO_2. Those units made in 1931 and 1932 were of the open type in that a shaft seal was employed between the motor and compressor even though a single shaft served both parts. Two charging ports provided means of testing and charging the system.

From 1934 to 1939 the same design of compressor was used but the seal was eliminated and the motor housing and compressor body were screwed together making a hermetic unit. Charging ports were still used and the system still employed SO_2.

These two units were thoroughly described and illustrated in the January 1934 and April 1936 issues of this journal. The essential service data for each cabinet model produced during those years is contained in Table 1.

In 1938 a single cylinder hermetic compressor charged with SO_2 was introduced which in appearance and design closely resembled the F12 Hermetic with which this article is chiefly concerned. These units are equipped with ⅛ hp. motors and the refrigerant control is a capillary tube.

Instructions on Hermetic Units

The design of this hermetic unit is of a very advantageous type—especially to the service man since it has the advantage of a hermetically sealed machine in the fact that it has no shaft seals, etc. It also has the advantage of being easy to service in the field.

This unit is equipped with a reciprocating Scotch-yoke type compressor, a ⅛ h.p. motor and a capillary tube, size .032 I.D. six feet long as a refrigerant control. The capillary tube is soft soldered to the suction line at the back of the cabinet and silver soldered into the system resulting in a very efficient heat exchanger. A filter (diam. ½") or a Silica Gel Dryer (diam. 1¼") with a screen mesh 1/10 of the I.D. of the capillary tube is placed in the liquid line in the outlet tube at the bottom of the condenser, and has flare connections at both ends, making it easily replaceable in the field.

The relay is used, not only in starting the ⅛ h.p. split phase motor, but also as an overload protection. If the motor is overloaded, the relay will break the circuit and automatically reclose it after approximately two minutes. This will continue until the overload is relieved.

All service problems can be easily analyzed with gauges connected to the fittings at each side of the motor compressor assembly. Before connecting gauge, stop unit and allow 8 minutes for pressure to equalize throughout system, so that the connection may be made with a negligible loss of refrigerant and without air being drawn into the system.

The system must be discharged when replacements, such as motor compressor assemblies, filters, evaporators, etc., are being made.

The following information on the hermetic unit is given not as sufficient instructions to make internal repairs but simply to serve as a reminder or reference for the individual who has visited the factory and is familiar with the replacing of parts.

Table 1—Oil and Refrigerant Data on the Gibson Refrigerators

Year	Model No.	Refrigerant Used	Refrigerant Amount	Oil	Motor Size	Refrigerant Control	Belt Size
	SG-30	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	SG-35	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	SG-47	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	SG-63	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	SG-82	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	SG-82B	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	PG-148	SO	44 ozs.	20 ozs.	(2) 1/6	Ex Va	Direct
1932	SG-37B	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	PG-47	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	SG-54	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	PG-54	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	PG-63	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	PG-82	SO	22 ozs.	10 ozs.	1/6	Ex Va	Direct
	L-535	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	L-710	SO	39 ozs.	14 ozs.	1/6	HSF	Direct
	LH-54	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	PH-54	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	LH-63	SO	39 ozs.	14 ozs.	1/6	HSF	Direct
	PH-63	SO	39 ozs.	14 ozs.	1/6	HSF	Direct
	LH-77	SO	43 ozs.	14 ozs.	1/6	HSF	Direct
	PH-77	SO	43 ozs.	14 ozs.	1/6	HSF	Direct
1933	LH-82	SO	43 ozs.	14 ozs.	1/6	HSF	Direct
	PH-82	SO	43 ozs.	14 ozs.	1/6	HSF	Direct
	LH-98	SO	47 ozs.	14 ozs.	1/6	HSF	Direct
	PH-98	SO	47 ozs.	14 ozs.	1/6	HSF	Direct
	LH-49	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	LH-50	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	LG-53	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	LG-72	SO	39 ozs.	14 ozs.	1/6	HSF	Direct
	LH-148	SO	44 ozs.	14 ozs.	(2) 1/6	HSF	Direct
	PH-148	SO	44 ozs.	14 ozs.	(2) 1/6	HSF	Direct
	LR-494	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	LR-504	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	LR-574	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	PR-574	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	SR-534	SO	35 ozs.	14 ozs.	1/6	HSF	Direct
	SR-724	SO	39 ozs.	14 ozs.	1/6	HSF	Direct
1934	LR-634	SO	39 ozs.	14 ozs.	1/6	HSF	Direct
	PR-634	SO	39 ozs.	14 ozs.	1/6	HSF	Direct
	LR-774	SO	43 ozs.	14 ozs.	1/6	HSF	Direct
	PR-774	SO	43 ozs.	14 ozs.	1/6	HSF	Direct
	L2-864	SO	43 ozs.	14 ozs.	1/6	HSF	Direct
	P2-864	SO	43 ozs.	14 ozs.	1/6	HSF	Direct
	B-4	SO	30 ozs.	10 ozs.	1/8	HSF	36x1/2
	B-475	SO	43 ozs.	10 ozs.	1/8	HSF	36x1/2
	BF-4	SO	30 ozs.	10 ozs.	1/8	HSF	36x1/2
	BFT-4	SO	30 ozs.	10 ozs.	1/8	HSF	36x1/2
	BT-4	SO	30 ozs.	10 ozs.	1/8	HSF	36x1/2
	BX-4	SO	43 ozs.	10 ozs.	1/8	HSF	36x1/2
	L-575	SO	43 ozs.	16 ozs.	1/6	HSF	Direct
1935	L-705	SO	57 ozs	16 ozs.	1/6	HSF	Direct
	L-835	SO	57 ozs.	16 ozs.	1/6	HSF	Direct
	LX-575	SO	43 ozs.	16 ozs.	1/6	HSF	Direct
	MG-35	SO	43 ozs.	16 ozs.	1/6	HSF	Direct
	MG-415	SO	43 ozs.	16 ozs.	1/6	HSF	Direct
	P-575	SO	43 ozs.	16 ozs.	1/6	HSF	Direct
	P-705	SO	57 ozs.	16 ozs.	1/6	HSF	Direct
	P-835	SO	57 ozs.	16 ozs.	1/6	HSF	Direct
	S-46	SO	45 ozs.	16 ozs.	1/6	HSF	Direct
	S-66	SO	58 ozs.	16 ozs.	1/6	HSF	Direct
	S-86	SO	58 ozs.	16 ozs.	1/6	HSF	Direct
1936	CB-696	SO	58 ozs.	16 ozs.	1/6	HSF	Direct
	CB-796	SO	58 ozs.	16 ozs.	1/6	HSF	Direct
	SD-646	SO	58 ozs.	16 ozs.	1/6	HSF	Direct
	PCB-696	SO	58 ozs.	16 ozs.	1/6	HSF	Direct
	PCB-796	SO	58 ozs.	16 ozs.	1/6	HSF	Direct
	S-47	SO	47 ozs.	18 ozs.	1/6	HSF	Direct
	S-57	SO	47 ozs.	18 ozs.	1/6	HSF	Direct
	S-67	SO	58 ozs.	18 ozs.	1/6	HSF	Direct
	S-77	SO	58 ozs.	18 ozs.	1/6	HSF	Direct
	S-667	SO	57 ozs.	18 ozs.	1/6	HSF	Direct
1937	CB-587	SO	47 ozs.	18 ozs.	1/6	HSF	Direct
	CB-697	SO	58 ozs.	18 ozs.	1/6	HSF	Direct
	CB-797	SO	58 ozs.	18 ozs.	1/6	HSF	Direct
	CB-867	SO	58 ozs.	18 ozs.	1/6	HSF	Direct
	PCB-587	SO	47 ozs.	18 ozs.	1/6	HSF	Direct
	PCB-697	SO	58 ozs.	18 ozs.	1/6	HSF	Direct
	PCB-797	SO	58 ozs.	18 ozs.	1/6	HSF	Direct
	PCB-867	SO	58 ozs.	18 ozs.	1/6	HSF	Direct

TABLE 1—CONTINUED

Year	Model No.	Refrigerant Used	Refrigerant Amount	Oil	Motor Size	Refrigerant Control	Belt Size
	S-58	SO	47 ozs.	18 ozs.	½	HSF	Direct
	S-68	SO	57 ozs.	18 ozs.	½	HSF	Direct
	S-78	SO	57 ozs.	18 ozs.	½	HSF	Direct
	CB-588	SO	47 ozs.	18 ozs.	½	HSF	Direct
	CB-698	SO	57 ozs.	18 ozs.	½	HSF	Direct
	CB-798	SO	57 ozs.	18 ozs.	½	HSF	Direct
1938	CB-868	SO	57 ozs.	18 ozs.	½	HSF	Direct
	S-48	F12	16 ozs.	16 ozs.	¼	Cap T	Direct
	SD-688	F12	18 ozs.	16 ozs.	¼	Cap T	Direct
	MS-688	F12	18 ozs.	16 ozs.	¼	Cap T	Direct
	S-638	F12	18 ozs.	16 ozs.	¼	Cap T	Direct
	A-378	F12	16 ozs.	16 ozs.	⅛	Cap T	Direct
	D-479	SO	28 ozs.	18 ozs.	½	HSF	Direct
	E-589	SO	47 ozs.	18 ozs.	½	HSF	Direct
	E-699	SO	57 ozs.	18 ozs.	½	HSF	Direct
	E-799	SO	57 ozs.	18 ozs.	½	HSF	Direct
	C-69	F12	10 ozs.	18 ozs.	¼	Cap T	Direct
	CU-69	F12	10 ozs.	18 ozs.	¼	Cap T	Direct
1939	CF-69	F12	10 ozs.	18 ozs.	¼	Cap T	Direct
	D-39	F12	10 ozs.	18 ozs.	¼	Cap T	Direct
	D-49	F12	10 ozs.	18 ozs.	¼	Cap T	Direct
	D-59	F12	10 ozs.	18 ozs.	¼	Cap T	Direct
	D-69	F12	10 ozs.	18 ozs.	¼	Cap T	Direct
	D-79	F12	10 ozs.	18 ozs.	¼	Cap T	Direct
	A-379	F12	10 ozs.	18 ozs.	⅛	Cap T	Direct
	DA-479	F12	10 ozs.	18 ozs.	⅛	Cap T	Direct
	A-330	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	A-470	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	AA-330	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	AA-470	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	C-630	F12	9 ozs.	20 ozs.	⅛	Cap T	Direct
	CU-630	F12	9 ozs.	20 ozs.	⅛	Cap T	Direct
	CUA-630	F12	9 ozs.	20 ozs.	⅛	Cap T	Direct
1940	CDU-630	F12	9 ozs.	20 ozs.	⅛	Cap T	Direct
	CF-630	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	CFA-630	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	E-550	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	E-640	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	E-700	F12	10 ozs.	20 ozs.	⅛	Cap T	Direct
	CSF-630	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	CSFA-630	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	F-680	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	SF-791	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	SF-691	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	F-681	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	F-6721	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
1941	F-671	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	CUB-631	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	CU-631	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	C-631	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	A-471	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct
	A-331	F12	9½ ozs.	20 ozs.	⅛	Cap T	Direct

1. The cylinder head, head valves and cylinder can be taken off by removing the cap screws on the cylinder head.
2. The compressor base is bolted to the compressor with cap screws. If the base is removed, the piston and cross slide can be taken out.
3. The cap of the motor housing is screwed on and can be removed if a suitable wrench is available. The rotor is pressed on the crankshaft. To remove crankshaft and rotor, force the crankshaft down through the compressor with a screw type press. Of course, the base and piston will have been removed previously.
4. The stator is pressed into the housing and a special screw type puller will be necessary to remove it.

All parts are selectively fitted at the factory and should, likewise, be fitted when replacing parts in the field. This will require a stock of service parts being kept in the field. It is also advisable and generally necessary, to use all new Neoprene gaskets when a job is re-assembled.

Extreme care is necessary when working on the inside of this assembly. Make certain that all parts are carefully cleaned and dried. All parts changed should be carefully oiled with new oil and, after any repairs have been made, the assembly should be dehydrated or dried in an oven for several hours, then both suction and discharge ports should be sealed.

A new Neoprene gasket, which is used to seal between the motor and cap, should always be used when assembling. Make cer-

tain the old gasket is carefully and entirely removed and the surfaces are clean.

Automatic Starting and Overload Relay

The 1938-39-40 and 41 hermetic units are equipped with an automatic starting and overload relay. This mechanism starts the motor and also gives positive protection against any possible overload in addition to automatically starting the motor mechanism after the overload has tripped. Since the operation of this relay is slightly different from the conventional or magnet type, the following explanation will be very helpful.

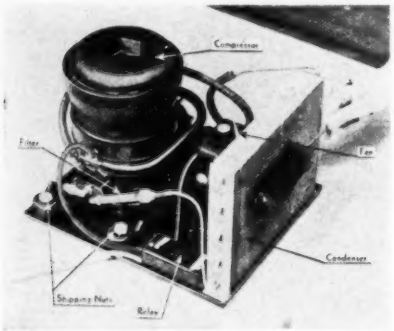


Fig. 2—The HF-89 unit used in 1939. Brushing out the condenser regularly is important on these and other models.

When the machine is first started, both the starting and running winding contacts are closed. Between one and two seconds after the machine has started, the wire in the relay heats thus expanding and lengthening the hot wire enough to break the starting contact. Should any overload whatsoever (in excess of that specified) be placed on the machine, the wire inside the relay will heat further and thus break the running winding contact and no more current passes through the motor. In approximately one to two minutes the relay wire will cool and the motor will then start again. This is entirely automatic and the relay will continue to try to start the motor indefinitely.

It is important to understand that when the machine is operating normally and the control button is pushed to the off position and immediately pushed on again, the compressor will not start immediately. In explanation of the above, when the control button is pushed to the off position, the starting winding contact is open. When the button is pushed back on again immediately, the relay is in the same position (since it has not had time to change) that is, with the starting contact open and the running contact closed. Thus the machine will not start and the current through the running winding will immediately heat the wire and break the running winding contact. It then requires between one and two minutes, depending on the room temperature, for the relay wire to cool, at which time the starting winding and the running winding contacts are closed and the machine starts.

The above should be studied and understood thoroughly by the service man. Otherwise the operation of the machine under such and similar conditions might be very confusing.

Control

The Ranco control does not carry any overload mechanism since the automatic starting and overload relay, described above, gives positive protection. It is, therefore, important when ordering units or automatic overloads to supply accurately the voltage and cycle of the power supply on which the refrigerator is to be used.

TABLE 2—APPROXIMATE HEAD PRESSURES

Room Temp. °F.	1937-8 HSF-7 HSF-8 Units	1939 AHF-89 HF-89 Units	1940 AHF-80 Unit	1941 AHF-81 Unit
65	102	112	128	120
70	111	119	137	128
75	119	126	146	137
80	128	134	155	146
85	136	142	164	155
90	145	150	174	164
95	154	159	183	174
100	163	168	193	183
105	173	180	204	193

NOTE—Some models employed a fan cooled condenser. The head pressures are then about two pounds lower.

Approximate Hi-side Pressures

Before taking a pressure reading in an attempt to analyze trouble, always be sure that the evaporator temperature is approximately 20° or lower; or cabinet temperature is below 50° F.

If Hi-side pressure runs lower than normal, as indicated by Table 2, it may be due to unusually good air circulation through the condenser, the compressor may be inefficient, or system may be undercharged.

Hi-side pressure may run higher than normal if the refrigerator is not located where it can obtain good air circulation, condenser may be dirty, there may be air in the system, there may be a restriction in the Hi-side (plugged filter) or system may be overcharged.

(To be continued)

Building a
Thermostat Test Bench

FOR the duration of this war, more and more repair of parts, ordinarily replaced, will have to be done in order to conserve materials. Important among these parts are thermostats and thermostatic expansion valves. Before the repair is made some means of testing is desirable to determine just what the trouble is. After repair, a testing device is necessary in order to secure proper adjustments.

The test bench illustrated in Fig. 1 has proven very useful for this purpose. It is of wood construction with a plywood top approximately 16x20 inches. The condensing unit is mounted under the bench or in any nearby location. The parts and equipment needed to complete the bench include the wall switch "A" which is used as a master switch; the dial thermometer "B"; the wall switch "C" which is used to short out the thermostat; the double wall outlet "D" into which the thermostat being repaired can be plugged; and the specially constructed evaporator containing three or more wells.

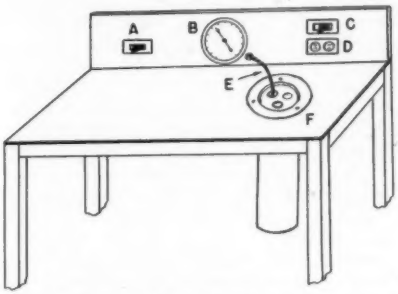


FIG. 1—THERMOSTAT TEST BENCH.
A—Main switch
B—Dial Thermometer
C—Switch to short out Thermostat
D—Double outlet for Thermostat
E—Thermometer capillary tube
F—Evaporator

Fig. 2 shows details of the evaporator construction. The outer case is made of a length of 2½ inch pipe, 8½ inches long. Two discs of ⅛ inch steel are cut to fit snuggly in the ends of the pipe and the bottom one brazed in place. The top disc is drilled with a ½ inch or ⅝ inch drill to receive three or more 7 inch lengths of copper tube. The tubes are sealed at one end to form wells. Then they are brazed into the disc with the brazing bead on the underside. The assembled disc and tubes can then be brazed into the upper part of the evaporator locating the upper disc about ⅜ inch from the top of the outer casing.

A third disc about 4 inches in diameter and about 1/16 inch thick is bored to fit over the outer casing and brazed in place. This acts as a mounting flange and is provided with three screw holes as shown.

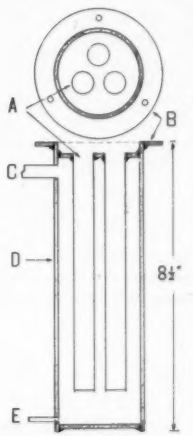


FIG. 2—THE EVAPORATOR.
A—½" or ⅝" copper tube wells
B—Mounting flange
C—Suction line
D—2½" pipe casing
E—Liquid line

The evaporator should be operated in a flooded condition, using a capillary tube about 10 feet of .032 tubing, or a high side float as a liquid control. Refrigerant can be charged in until frost appears on the suction line. The liquid connection is at the

bottom of the evaporator and the suction line at the top. It is not advisable to insulate the evaporator because rapid warming after each cycle is necessary to speed up the testing.

When the bench is all set up and ready for use the wells should be partially filled with oil, gylcerine, zerone, or some other low freezing point liquid. The thermostat to be tested is plugged into the panel outlet and the machine allowed to operate automatically from the thermostat. The feeler bulb of the thermostat is inserted in one of the evaporator wells and the bulb of the dial thermometer inserted in another. As the thermostat under test stops and starts the condensing unit, the cut-out and cut-in temperatures can be noted on the dial thermometer and adjusted to the desired settings.

Testing Valves

The test bench is also useful in testing thermostatic expansion valves for smooth operation, superheat settings and needle seat leaks. Set the valve up with an air line (75 to 100 lbs. gauge pressure) connected to the inlet of the valve and a compound gauge loosely connected to the outlet of the valve so that a small amount of leakage will pass through the threads. Insert the feeler bulb in one of the evaporator wells, start the condensing unit and open the air valve.

Superheat Setting

The superheat adjustment nut should be set so that pressure on the compound gauge reads as follows for the different refrigerants:

Freon	21 lbs.
Methyl Chloride	14 lbs.
Sulphur Dioxide	3 lbs.

These pressures are equivalent to an evaporating temperature of 20°F. and if the feeler bulb is kept at a temperature of 30°F. as shown on the dial thermometer, there is a difference of 10°. In other words, the valve is adjusted for 10° of superheat. This is the setting required for most applications. A small amount of leakage through the compound gauge connection should be maintained throughout this test.

For the next test, tap the valve body lightly to see if it works smoothly. If it does work smoothly the pressure on the gauge should jump about one pound but should immediately fall back to its original reading. If the pressure stays higher or lower it is probable that the movement of the needle is sluggish.

Now screw the gauge up tight so as to stop the leakage through the threads and determine if the expansion valve closes off tightly. With a good valve the pressure will increase a few pounds and then either stop or build up very slowly. With a leaking valve the pressure will build up rapidly until it equals the inlet pressure.

Again loosen the gauge so as to permit leakage through the threads and then remove the feeler bulb from the evaporator well, allowing it to warm up to room temperature. The pressure should increase rapidly, indicating that the power element has not lost its charge. If the pressure does not increase when this is done, the power element is dead.

Gas Charged Valves

With the gas charged expansion valves, the amount of charge in the power element is limited and the pressure will not build up above the specified pressure. This pressure is usually marked on the power element and must be considered when testing gas charged valves.

The final test is a leak test in which high pressure is used at both openings of the valve and the valve tested for leaks through the bellows and through joints or gaskets.

When planning the layout of your test bench it is suggested that you also consider a rapid charger since both a charger and the test bench could be operated from the same condensing unit. It is even feasible to include the special evaporator of the charger in the bench just described.

Lester R. Wall
Paterson, New Jersey

I would not miss receiving THE REFRIGERATION SERVICE ENGINEER for anything, and it is as important to every service man as his tools.

George S. Gularte
Wasco, California

I personally think that every refrigeration service engineer should take this monthly magazine as a help to him in his field.

Carl Johl
Ephrata, Washington

I surely enjoy the Question Box and would hate to do without my copies of THE REFRIGERATION SERVICE ENGINEER.

Model 91A

(Continued from January issue)

Philco Air Conditioner

By WALTER G. WARNER

Speed Control

THE "fast" and "slow" switch on the control panel allows the fans to operate at high or low speed. In the "fast" position there is a slight air rush noise which might be objectionable in very quiet rooms. When the Model 91A is used in applications such as these, the "fast-slow" switch can be set to the "slow" position and then the noise will be reduced to a very low level.

When the switch is in the "slow" position, the speed of the air over the cooling coil will be reduced, and the air will remain in contact with the coil for a longer period of time. As a result more humidity will be extracted. Thus on very humid days the machine should be operated with the switch in the "slow" position to extract the maximum amount of humidity and thus to give the greatest possible comfort.

Fig. 5 shows the "fast"—"slow" position switch. When the switch is in the "slow" position resistor (1) is thrown into the capacitor circuit of the motor, thus reducing the motor's speed. When the switch is in the "fast" position, the switch short circuits the resistor, thus applying full voltage to the motor windings and allowing the motor to operate at high speed. Fig. 4 shows the location of this resistor at the rear of the cabinet.

Service

A year's experience with the Model 91A Philco shows that there are several sources of service troubles.

Complaint: Compressor Runs—No Cooling

On all early units in the 91A series the head of the compressor is connected to the condenser by means of a length of a ½ inch tubing that has in it no provision for absorbing vibration. As a result, the flare at the discharge service valve very often splits and allows the Freon in the system to escape.

In order to effect a repair, it is generally easiest and quickest to disconnect the unit from the window duct and move the unit away from the window. Then by removing the back, left side and front pieces of celotex from the machine compartment you can readily get at the condenser line and discharge valve. A satisfactory repair can be made by cutting the condenser line mid-way between the compressor head and the condenser and reconnecting the condenser and compressor through a piece of ½ inch tubing in which there is a vibration loop at least six inches in diameter. The factory now supplies a replacement "U" loop with sweat connections. However, for field repairs it is easier to make up your own loop out of soft copper tubing and splice this to the condenser with flare connections rather than carry the paraphernalia required for sweating in the factory connection.

Complaint: Blown Fuses or Compressor Cycling

One of the frequent complaints on the 91A is "the fuses keep blowing." This generally happens because the electrical circuit feeding the 91A is fused with an ordinary fuse. Because of the high starting current, it is necessary to fuse the power circuit with a 20 ampere time delay fuse such as "Therma-Trip" or "Fusetron."

Another cause for "blown fuses" is undersized wiring. When the wiring is undersized, there is too great a voltage drop in the wires and the motor does not get full voltage. This causes the motors to draw excessive current and results in blown fuses. If the circuits are fused up high enough so that the fuses hold, the compressor motor will overheat and the internal motor thermostat will stop the compressor motor whenever the motor gets too hot. In this case the customer will complain of the cooling machine stopping and staying off from ½ to 1½ hours at a time and then starting again of its own accord. Table I gives the running currents on various electrical currents.

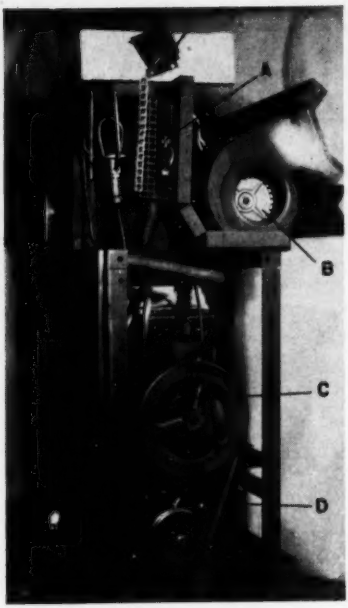


Fig. 4—End view of the conditioner with the cabinet panels removed.
A—Speed control resistor
B—Room air fan
C—Compressor
D—Compressor motor

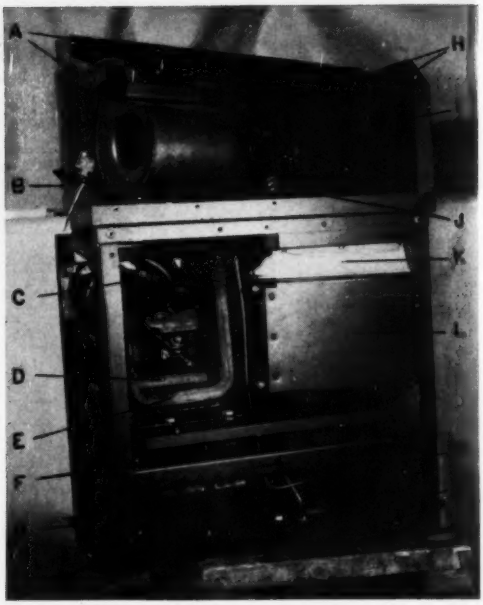


Fig. 5—Front view of conditioner with panels removed, showing: A—Top and side of chassis removed to provide access to switch; B—Switch; C—Field installed vibration loop in discharge line; D—Compressor; E—Suction line; F—Spring suspension; G—Motor; H—Room air fan; I—Fan motor; J—Fan motor fuse; K—Canvas connection between condenser and chassis; L—Condenser; M—Condenser air fan; N—Receiver.

Fuses will also blow on this series of units if the user turns the unit off and then immediately turns it on again. Under these conditions, the head and back pressures are unbalanced and the load on the motor is so great that the motor cannot turn over. As a result, the locked rotor current blows the fuse or fusetron in the circuit. Therefore it is necessary to caution the user against immediately starting the unit after it has been operating. At least five minutes time must be given to allow the pressures to equalize and the motor to start under normal load.

Complaint: Compressor or Fan Motor Won't Operate

A number of service calls on D.C. models have been caused by pieces of asbestos becoming lodged between the switch contacts. To correct this trouble, it is necessary to remove the top, front, and one side panel of the upper section of the units. Since the rheostat is fastened to the room air fan assembly and hence it is necessary to lift out this assembly in order to get at the bolts which hold the rheostat in place. In order to get at the rheostat at least 75 screws have to be removed. Fig. 5 shows the unit with the switch exposed.

(Concluded)

Table 1—Amperes Drawn at Various Voltages

		COMPRESSOR MOTOR AMP.			
VOLTS	FAN AMP.	CENTURY	EMERSON	CYCLE	PHASE
110	1.7	10.4	11	60	1
220	.85	5.2	5.5	60	1
110	1.9	17.0	13.6	50	1
220	.95	6.0	6.8	51	1
115	.6	6.3			
230	.3	3.2			

Lloyd Merkl
Appleton, Wisc.

A wonderful magazine for the average refrigeration service man.

Service Information on the Stewart-Warner Refrigerator

THE Stewart-Warner Corporation began the manufacturing of domestic refrigerators in 1932. With the exception of the first two years when an expansion valve was used and an entirely different type compressor was employed, no major changes in the system were made until 1939.

The system during these years was a conventional belt driven unit charged with SO_2. The refrigerant control was a low side float and the compressors were either twin or single cylinder. Table 1 shows the essential service data of all models from 1932 to 1942 inclusive. The single cylinder compressor may be recognized in this table by the 14 ounce oil charge.

In 1939 two new systems were introduced. The standard line was changed to a hermetic unit charged with F-12 and has remained essentially the same in succeeding years. In addition a Dual Temperature refrigerator providing a frozen food compartment and a high humidity storage compartment was added to the line.

The Dual Temperature refrigerator of 1939 was known as the Model 769. It employed an open type twin cylinder compressor and a capillary tube system charged with F-12. The 1940 Dual Temp (Models 660 and 860) employed the hermetic unit and a capillary tube system. The system is equipped with service shut-off valves which make it serviceable in the field.

The 1941 Dual Temp models (661, 671, 861 and 871) and the 1942 models (662, 672, 862, 872, 681, 691, 881 and 891) are essentially the same as the 1940 models.

Standard Hermetic Models

The Stewart-Warner hermetic unit used in the standard models, is a capillary tube system using a single cylinder reciprocating compressor charged with F-12. If conforms to standard practice in every important respect although there are several features designed to add economy and quietness. The principal among these features is an evaporator developed for capillary tube operation which results in shorter freezing time and lower power consumption. In addition the self-aligning connecting rod in the compressor, the rubber and spring suspension of the unit and a completely sound-proofed unit compartment result in quiet operation.

Repairs to this refrigerator are relatively simple. The sealed unit itself cannot be repaired in the field so that it becomes necessary to remove it to the shop if an occasional one breaks down.

There are a number of secondary parts, however, which can be serviced or replaced separately in the field. These are the relay, the fan, and the cold controls. Service troubles and remedies on the Stewart-Warner refrigerator are essentially the same as on all other hermetic capillary tube systems and because there has been sufficient published data on this type of system it is unnecessary to repeat it here.

The electrical system likewise is identical to many other hermetics and it is sufficient to say that both the General Electric relay and the Delco hot wire relay are used. Both of these electrical systems have been described in the service instructions on other makes of refrigerators. Wiring diagrams for these units are the same as for the Dual Temp.

Dual Temperature Models

Of much more interest to the Service Engineer because these refrigerators seem more difficult to understand is the Dual Temperature model, first of which was produced in 1939 and known as the Model 769. Because two separate coils are employed in this refrigerator and quite a wide variation in temperature is maintained in each, some difficulty in securing proper adjustment is experienced unless a thorough understanding of the refrigerator is first obtained.

The Model 769 Dual Temp refrigerator uses an open unit in a modified capillary tube system, with Freon F-12 as the refrigerant. The complete refrigeration cycle is shown in diagrammatic form in Fig. 1.

Table 1. Stewart Warner Essential Service Data

Year	Model No.	Refrigerant Used	Refrigerant Amount	Oil	Motor Size	Refrigerant Control	Belt Size
1932	88	SO	4¼ lbs.	1¼ pt.	⅛	LSF	40⅝x½
	89	SO	4¼ lbs.	1¼ pt.	⅛	LSF	40⅝x½
	90	SO	4¼ lbs.	1¼ pt.	⅛	LSF	40⅝x½
	91	SO	4¼ lbs.	1¼ pt.	⅛	LSF	40⅝x½
	92	SO	4¼ lbs.	1¼ pt.	⅛	LSF	40⅝x½
1933	040	SO	1½ lbs.	7½ ozs.	⅛	Ex Va	31x½
	045	SO	1½ lbs.	7½ ozs.	⅛	Ex Va	31x½
	055	SO	1½ lbs.	7½ ozs.	⅛	Ex Va	31x½
	065	SO	1½ lbs.	7½ ozs.	⅛	Ex Va	31x½
	077	SO	1½ lbs.	7½ ozs.	⅛	Ex Va	31x½
1934	0254	SO	3½ lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0454	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0454-S	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0554	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0564	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0574	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0704	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0714	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0724	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0834	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
1935	0455	SO	4½ lbs.	14 ozs.*	⅛	LSF	37x½
	0505	SO	4½ lbs.	14 ozs.*	⅛	LSF	37x½
	0605	SO	4½ lbs.	14 ozs.*	⅛	LSF	37x½
	0465	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0475	SO	4½ lbs.	14 ozs.*	⅛	LSF	37x½
	0555	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0705	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
	0711	SO	5 lbs.	22 ozs.*	⅛	LSF	39⅜x½
1936	456	SO	4½ lbs.	20 ozs.*	⅛	LSF	37x½
	556	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	656	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	566	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	666	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	766	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	866	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	666-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	766-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	866-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
1937	357	SO	4½ lbs.	20 ozs.*	⅛	LSF	37x½
	457	SO	4½ lbs.	20 ozs.*	⅛	LSF	37x½
	557	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	657	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	567	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	667	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	767	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	867	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	567-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	667-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	767-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	867-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
1938	358	SO	4½ lbs.	20 ozs.*	⅛	LSF	37x½
	458	SO	4½ lbs.	20 ozs.*	⅛	LSF	37x½
	558	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	658	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	568	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	668	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	768	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	568-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	668-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	768-P	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	550	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	770	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
1939	459	F12	10 ozs.	.....	..	Cap. T	Sealed
	559	F12	10 ozs.	.....	..	Cap. T.	Sealed
	659	F12	10 ozs.	.....	..	Cap. T.	Sealed
	769	F12	2¾ lbs.	24 ozs.*	¼	Cap. T.**	39⅜x½[2]
	458	SO	4½ lbs.	20 ozs.*	⅛	LSF	37x½
	558	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	658	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	568	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	668	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½
	768	SO	5 lbs.	24 ozs.*	⅛	LSF	39⅜x½

TABLE 1—CONTINUED

Year	Model No.	Refrigerant Used	Refrigerant Amount	Oil	Motor Size	Refrigerant Control	Belt Size
1940	420	F12	10 ozs.	.....	..	Cap. T.	Sealed
	610	F12	10 ozs.	.....	..	Cap. T.	Sealed
	620	F12	10 ozs.	.....	..	Cap. T.	Sealed
	630	F12	10 ozs.	.....	..	Cap. T.	Sealed
	540	F12	10 ozs.	.....	..	Cap. T.	Sealed
	640	F12	10 ozs.	.....	..	Cap. T.	Sealed
	570	F12	10 ozs.	.....	..	Cap. T.	Sealed
	670	F12	10 ozs.	.....	..	Cap. T.	Sealed
	660	F12	14 ozs.	.....	..	Cap. T.**	Sealed
	860	F12	15 ozs.	.....	..	Cap. T.**	Sealed
	580	SO	5 lbs.	24 ozs.*	¼	LSF	39 13/16 x ½
	680	SO	5 lbs.	24 ozs.*	¼	LSF	39 13/16 x ½
	780	SO	5 lbs.	24 ozs.*	¼	LSF	39 13/16 x ½
1941	401	F12	9 ozs.	.....	..	Cap. T.	Sealed
	601	F12	9 ozs.	.....	..	Cap. T.	Sealed
	611	F12	9 ozs.	.....	..	Cap. T.	Sealed
	621	F12	9 ozs.	.....	..	Cap. T.	Sealed
	801	F12	9 ozs.	.....	..	Cap. T.	Sealed
	821	F12	9 ozs.	.....	..	Cap. T.	Sealed
	661	F12	14 ozs.	.....	..	Cap. T.	Sealed
	671	F12	14 ozs.	.....	..	Cap. T.**	Sealed
	861	F12	15 ozs.	.....	..	Cap. T.**	Sealed
	871	F12	15 ozs.	.....	..	Cap. T.**	Sealed
	681	F12	14 ozs.	.....	..	Cap. T.**	Sealed
	691	F12	14 ozs.	.....	..	Cap. T.**	Sealed
	881	F12	15 ozs.	.....	..	Cap. T.**	Sealed
	891	F12	15 ozs.	.....	..	Cap. T.**	Sealed
1942	402	F12	9 ozs.	.....	..	Cap. T.	Sealed
	602	F12	9 ozs.	.....	..	Cap. T.	Sealed
	612	F12	9 ozs.	.....	..	Cap. T.	Sealed
	802	F12	9 ozs.	.....	..	Cap. T.	Sealed
	662	F12	14 ozs.	.....	..	Cap. T.**	Sealed
	672	F12	14 ozs.	.....	..	Cap. T.**	Sealed
	862	F12	15 ozs.	.....	..	Cap. T.**	Sealed
	872	F12	15 ozs.	.....	..	Cap. T.**	Sealed

*Correct oil charge is indicated when oil level is up ½" on oil gauge rod on side of Compressor; to check, remove oil gauge rod, clean it with dry cloth, and replace it, screwing it down tightly; then remove again to note indication.
**DPC valve used to control refrigerant flow to freezer chest in series with storage compartment.

If we follow the flow of refrigerant, starting at the compressor, we can trace its path through the condenser, where it is cooled by the fan until the compressed gas becomes liquid. The liquid Freon then flows through the dehydrator, which has been added to the system to remove any traces of moisture that may enter during assembly or in subsequent servicing in the field. From the dehydrator, the Freon, still as liquid, flows through the capillary tube, which is the pressure reducing medium for the upper food compartment evaporator plate and serves the same function as the float valve or expansion valve in older models. From the capillary tube, the refrigerant goes to the upper food compartment evaporator plate. Part of it is evaporated there to maintain proper tempertures within the main food compartment. The remainder of the F-12 liquid, as well as the F-12 gas, passes through the Differential Pressure Control (DPC) valve and into the frozen food compartment coils. Here all the remaining liquid F-12 evaporates, and the gas passes on through the accumulator back to the compressor.

There are a number of unusual and unique features of this system, whose functions may not be apparent from the cycle chart or that should be discussed in greater detail because of their importance. Perhaps the first of these is the Differential Pressure Control (DPC) valve. This device permits a constant pressure difference of about 20 pounds between the refrigerant in the two cooling coils, so that the lower coil is always colder than the upper one by a definitely fixed amount. As a result, it becomes possible to maintain correct temperatures in both compartments with only one cold control, which is clamped near the center of the upper compartment evaporator plate. This eliminates the necessity of using either two separate controls or a complicated double element control which may be subject to considerable service difficulties because of its more complicated constructions.

The pressure relief valve between the dehydrator and the upper food compartment coil, functions as a pressure by-pass to relieve the load when the unit is first put into service and the entire refrigerator is at

room temperature. Under such starting conditions, the head pressures will be quite high during the pulldown. While both the motor and compressor will safely carry this load, a certain amount of vibration and operating noise cannot be avoided. The pressure relief valve will relieve this load so that vibration and noise will not be excessive. After the refrigerator is down to normal temperature, the pressure relief valve will remain closed throughout the entire cycle and does not function again unless the refrigerator is shut down and then started again.

The heat exchanger improves efficiency of operation by pre-cooling the refrigerant before it gets to the cooling coil thus utilizing the refrigerating effect still left in the cold gas, which formerly was wasted.

The compressor is a twin cylinder open type compressor with a few modifications that are necessary due to the use of Freon ing it serviceable in the field. This part of the system remained the same through 1941 and 1942 models.

Some change was made in the evaporator design in 1940 but its function was practically the same. A cold plate placed in a vertical position in the back of the refrigerator cooled the regular storage section while a separate coil fastened to the bottom, back and top of the freezer locker, cooled this section. The pressure relief valve is omitted on all models after 1939.

In the 1941 and 1942 models the regular storage section is cooled by coils located in the walls of the refrigerator. In this way the cabinet liner serves as the cold plate.

Service troubles and their remedies are the same on all Dual Temp refrigerators. Many of the troubles encountered will be identical to any standard domestic refrigerator and these will not be discussed.

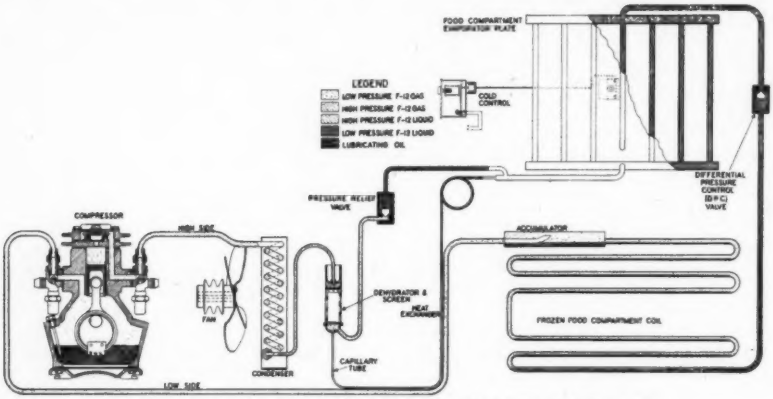


Fig. 1—The cycle of operation chart for the Model 769 Dual Temp.

12 instead of sulphur dioxide. The principal differences are in the gaskets and the seal assembly since Freon requires different materials. A ¼ hp. motor with a double V belt drive is used because of the greater load requirements of this unit.

1940-41-42 Dual Temp

The 1940 Dual Temp refrigerators use a sealed unit in a modified capillary tube system charged with F-12. The system is shown diagrammatically in Fig. 2. It differs from the 1939 model in that a hermetic unit is used instead of a belt driven unit. It is equipped with service valves, however, mak-

Troubles and their remedies peculiar to the Dual Temp are contained in Table 2.

Servicing Cold Controls

The cold control used in the Dual-Temp refrigerator differs from those used in other Stewart-Warner models primarily in that it has a considerably narrower differential and operating range. This is due to the fact that the evaporator plate has very much more effective surface than the ordinary evaporator, so that any change in its temperature has a considerably greater effect on food compartment temperature.

(Continued on page 34)

COMMERCIAL

INCREASE BUSINESS BY DOING A MORE EFFECTIVE JOB OF SELLING *Selling*

Los Angeles Reconditioning Service Turns Out 1500 Boxes in 1941

By Robert Latimer

WHENEVER an appliance dealer of Los Angeles, California, wishes to recondition any used refrigerator of any type whatsoever for sale, all he need do is lift his telephone and dial the number of Electrical Appliance Service Corporation, located at 2828 Newell St. From that point on, his reconditioning troubles are entirely handled by this unusually successful firm.

Last year the Electrical Appliance Service Corporation turned out 1,500 reconditioned refrigerators — all appearing as new as the day they left the factory, and unconditionally guaranteed for 90 days. More than 240 dealers made use of the specialized service which William Vogel, president of the company made available in November, 1939. At that time, Mr. Vogel, who is an old time refrigeration service man, had become convinced that the slip-shod reconditioning methods being used by dealers of the city were dragging down any possibility of profit—this even extending into the new-appliance field. Accordingly, he has since put reconditioning of refrigerators as much as eleven years old on a flat rate basis which gives the dealer entire surety of selling good merchandise, backed by a firm which can offer one-day service, and fully guarantee every step of its job. The idea "caught on" immediately, every dealer who had been experiencing problems of the sort taking up the offer at once. Now, as a result of the efficient service, and almost no complaints, Electrical Appliance Service Corporation has forty employees in its refrigerator-reconditioning plant, and maintains a stock of more than $45,000 worth of refrigerator parts, representing 17 manufacturers.

Major appliance dealers of Los Angeles are now enjoying profits on the sales of both new and used appliances which prior to 1939 were almost impossible. The reason is increased volume in used refrigerators, and a confidence on the part of the public which Electrical Appliance Service Corporation has passed along through its dealers. The service company will not permit dealers to make bad mistakes which cut into profit—and thus are a source of confidence almost unmatched.

All work of Electrical Appliance Service Corporation is done strictly by contract. Every dealer wishing service signs a contract to have all work done by Electrical Appliance Service Corporation. A standard rate of $20 for a one-door re-

frigerator up to ten cubic feet, or $25 for a hermetically sealed job is then the dealer's, providing he keeps up his end of the contract. All refrigerators are delivered to Mr. Vogel's plant by the dealer, and called for when finished—all work strictly cash. At the receiving dock, each is examined and estimated, for all repairs. If the refrigerator does not appear completely saleable, Electrical Appliance Service Corporation "turns it down" and informs the dealer why. Otherwise, they are completely reconditioned, including new motor parts, refinishing of interior and exteriors, new aluminum, new gaskets, new shelving and a complete re-enameling. All such work is on an "assembly line" theory, and is turned out so efficiently that from one to three days only are required for any average job. Steam cleaning equipment, painting equipment, re-tinning tanks, and a marvelous electrical shop make quick service possible. All boxes are guaranteed for 90 days, within a twenty mile circle surrounding Los Angeles. If the box is not "up to snuff" it is simply refused.

Where the more expensive $25 job is designated, Electrical Appliance Service Corporation provides a new armature, new refrigerant, and even a new motor, if necessary. A $10,000 shop has been required to cope with this business, but according to Vogel, the increasing large amount of field-unit jobs will bring this into more and more use. In any case, Electrical Appliance Service Corporation is certain that it offers service which cannot be duplicated by anything less than the factory which produced the original unit. No advertising has ever been needed—one dealer always informing another. Thus, the company often has a "waiting list" of twenty-five dealers.

During 1940, Electrical Appliance Service Corporation turned out 1,200 boxes, all of which functioned without complaint. There were only a few service calls necessitated and only two parts were replaced. This year, Mr. Vogel expects to turn out a minimum of 1,500 jobs, and to give even better service. The low flat rate, which Mr. Vogel believes the only solution to varying incomes, has given every subscribing dealer the opportunity to realize a $10 or $15 profit on most of his boxes. He recommends that dealers allow around $10 for an eight year old box, pay $20 to have it brought into practically-new condition and then sell it for a price which will allow him a $15 to $20 profit. In this way, refrigerator reconditioning in Los Angeles has become much less of a headache.

Special Building Houses Refrigeration for Middle West's Largest Market

ONE of the most efficient commercial refrigeration systems in food retailing history is a feature of the huge new Bettendorf Hampton Village Market, one of the largest Supermarkets in the country, which opened in St. Louis, Missouri, on December 20, 1941.

With 28,000 square feet of operating space, the market is located at Hampton and Chippewa Avenues in the southern section of the city, served by three major highways, and set up for parking 300 automobiles on more than four acres of parking space. The building itself is done in Williamsburg Colonial style, resembling a mansion more than a commercial food venture, surrounded by white picket fences, and topped with a beacon tower resembling a cupola on an old Virginia plantation house. All "period" resemblance ceases the moment a customer enters the store, however, as he finds inside some of the most modern food display and service equipment in the country.

Outstanding feature of the market is its refrigeration, which Joseph Bettendorf, young operator of another market in St.

This interior view of the Bettendorf Hampton village market of St. Louis, Mo., gives some idea of its size and the business-like arrangement of departments. The four departments are laid out in four "islands."

Louis in addition, chose carefully for protection against breakdowns and maintenance expense as well as insuring the quality of perishable foods sold. Typical is the meat department, which actually occupies 9,000 square feet of space with four separate meat departments. There are respectively, departments for Grade A meats, Blue Ribbon meats, Smoked Meats and Corned Beef, all Bettendorf specialties, and all under constant refrigeration. The four departments are laid out in four "islands" longitudinally down the length of the floor, each composed of from four to six Hussman-Ligonier display cases of 20 or 10 foot lengths. To the left is a poultry and fish department, a stainless steel soda fountain with 42 stools, a smaller soda fountain and kitchen for curb service of foods and soft drinks to the cars parked around the market, a hot-and-cold steam table for delicatessen goods, and an ice-cream manufacturing stand producing 160 gallons per day. Opposite the meat departments at the other end of the building is the largest dairy products department in the country, composed of four open-face "blanket cold" self service cases arranged into a square enclosure. Cheese, butter, eggs, milk, and other dairy items are perfectly refrigerated in these open cases under a blanket of chilled air.

To provide the refrigeration equipment for this huge outlay, the Bettendorf market built an 8,000 square foot brick building at the rear of the market, all but 1,500 feet of which is given over to ice making, storage refrigeration and deep freezing. There are 10 huge spruce walk-in coolers in the rear building, all mounted on skids and arranged for two-way use. Blower-type cooling units cool each. Six are used for the four meat departments, two for fruits, vegetables and other produce, and one each for cheese and dairy products. Located contiguously is a 9x6 deep-freeze room for frosted foods, sea foods and ice storage. The ribbon ice which chills fresh fish, soda fountain drinks and vegetables on display in self-draining display bins, is provided by a York Flak-Ice machine at the left of the deep-freeze room. Refrigeration units for the Nelson ice cream plant and Nelson soda fountains is self contained. Otherwise the job is done by nineteen in-

dividual compressors laid out in a long line along the wall of a narrow basement tunnel running the length of the building.

In laying out the compressors for most efficiency, Hussman Ligonier Company (who installed all but the self-contained units) planned each for quick service and repairs. Consequently, they are all easily demountable, connected with a circulating water system with quickly detachable valves to permit replacement of a faulty compressor with a spare unit. The 19 units are water cooled by copper jackets and lines connecting with a 1,500 gallon water tower on the roof, forced circulation by two pumps for winter and summer operation. Each rests upon a wooden base, on which it can be lifted out individually. Refrigeration provides temperatures from zero to 45 degrees, with individual thermostats for each unit. Total horsepower of the 19 units is 35. Four five-horsepower units handle the meat department, deep freezer and fish.

Double File System Brings Service Firm Consistent "Start Up" Calls

By Herbert Hanley

THE two most difficult problems of the refrigeration service firm specializing in air-conditioning maintenance—that of maintaining the loyalty of "old" customers and bringing in new accounts—have been ideally solved at North Side Refrigeration Service Company, St. Louis, Missouri, by means of a simple prospect followup system.

North Side Refrigeration Service, an authorized Frigidaire commercial refrigeration service agency, has for six years been featuring service on all types of air conditioning equipment, and has now regular annual service calls for equipment ranging from one-ton package conditioners in building offices to 100-ton department store and theatre systems. But, because the firm will not undertake any form of "contract service" whereby operation is guaranteed at a flat rate, it has experienced difficulty in keeping the same customers year after year.

In 1939, however, Lloyd Goodwin, manager of the firm, developed a simple followup system by means of visible file card indexes which has kept every owner of an air conditioning system "in the fold," and has produced at least 25 new customers per year since. The system consists of registration of every air conditioning system installed in St. Louis, this obtained by a frequent check with installation firms, and a watch over permits issued for such systems. As soon as one is registered, it goes into the file in duplicate—one entry giving facts and figures on the system on a 3½x5 inch orange file card, and the second entry onto one of ten large sheets which give at a glance the entire air conditioning potential market. Orange cards in the file show air-conditioning possibilities, green cards commercial refrigeration, and cream-colored cards, home appliances, refrigerators, and home lockers.

Both cards are used in the followup system, with the large sheets used first. By glancing at this, Mr. Goodwin can tell quickly which systems his firm is handling, and which they are not. Then a salesman can be sent out to make a contact or offer of service. If a call results, the North Side firm already has the orange card to begin keeping records.

This system has worked out to best advantage annually with the "start up" or "shut down" service necessary for large conditioning installations. In the fall, Mr. Goodwin sends out direct mail to some 2,000 potential accounts, pointing out that the time for shutting off the system, draining it, and sealing delicate parts has ar-

rived—making the "fall special" offer of doing all this work at a flat rate. In spring, the process is reversed—offering to check the compressor, clean out filters, etc., ready for the summer season. Form letters written by Goodwin are duplicated, one type for "old" customers, another for prospective accounts. The second letter introduces the North Side Refrigeration Service, explains in two paragraphs its service policy, and asks for an opportunity to serve the reader.

Weather Dictates Mailings

These direct-mail letters are sent out at various times each year, dependent upon weather reports—if a hot week looms in spring Mr. Goodwin can get 1,000 letters to "old" customers a few days in advance. As soon as the hot weather arrives a similar number goes out to prospects, hitting the potential customer with a timely suggestion which gets immediate attention. Spreading the mailing in this way has prevented "rush weeks" which make it difficult to deliver the service promised in the personal letter—and there are no strained relations over slow action. Seldom is there a complaint originating from tardiness in answering calls.

Follow Up on Phone

That's the first step. All prospects are given six days in which to answer the letter or give some indication of future business. Then, if nothing of the type occurs, the North Side Refrigeration Service comes back at the list with telephone calls —phoning the prospect, asking him whether he received the letter, and explaining the specialized services offered for start-up or shut-down air conditioning equipment. Year by year, this has developed new customers, established first calls which turn into regular accounts later on, and finally has given North Side Refrigeration Service the assurance that its "old customers" will continue as such. "Keeping 'old' customers is just as important as bringing in new accounts" it was summed up. "And the card file doesn't let us forget that point."

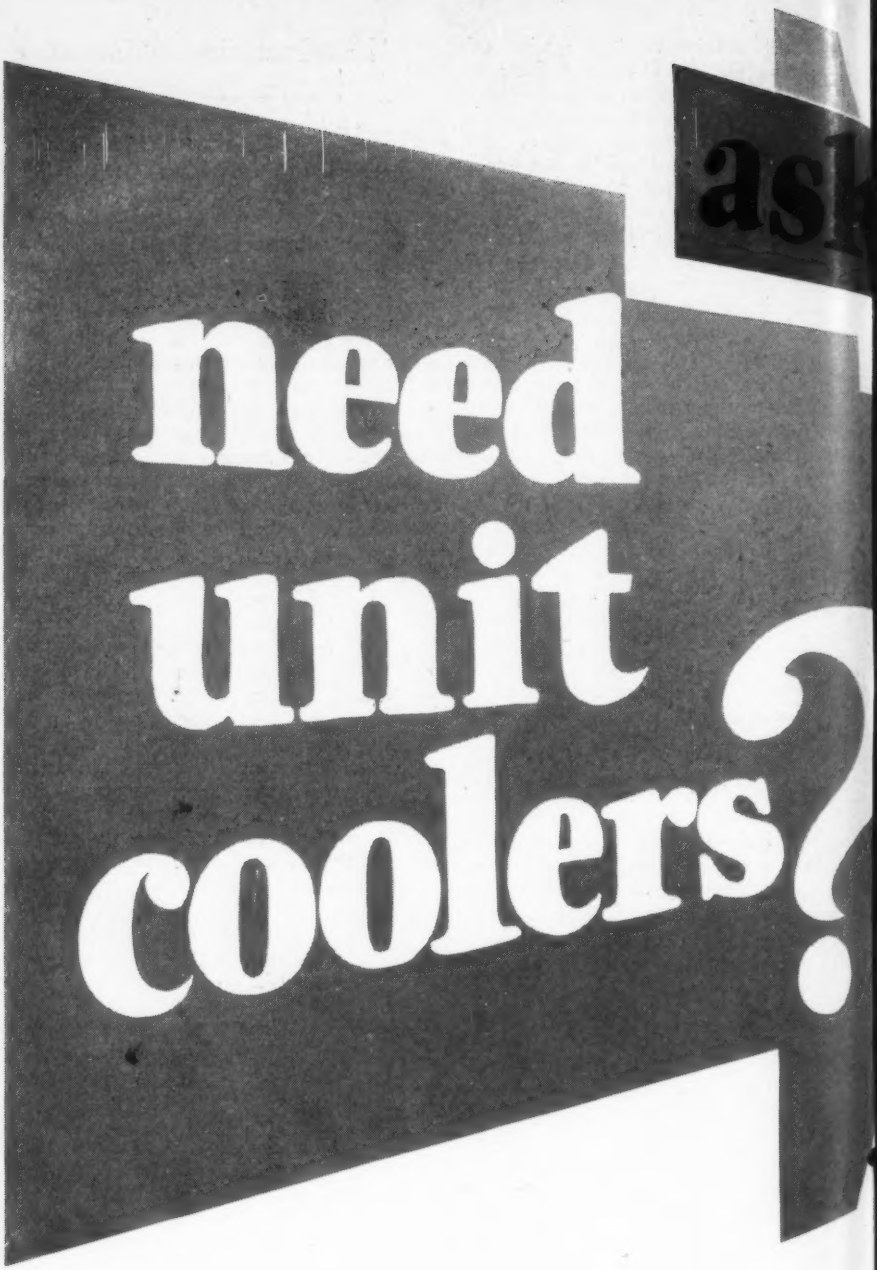
"Merchandising Maintenance" Service Firm's New Job

IN the face of the present war conditions, when refrigeration manufacture is almost at a standstill, the refrigeration service firm can tap an excellent market by simply offering "Maintenance" service to its customers, according to T. A. Prichett, president of the T. A. Prichett Company, commercial service firm of Cairo, Illinois.

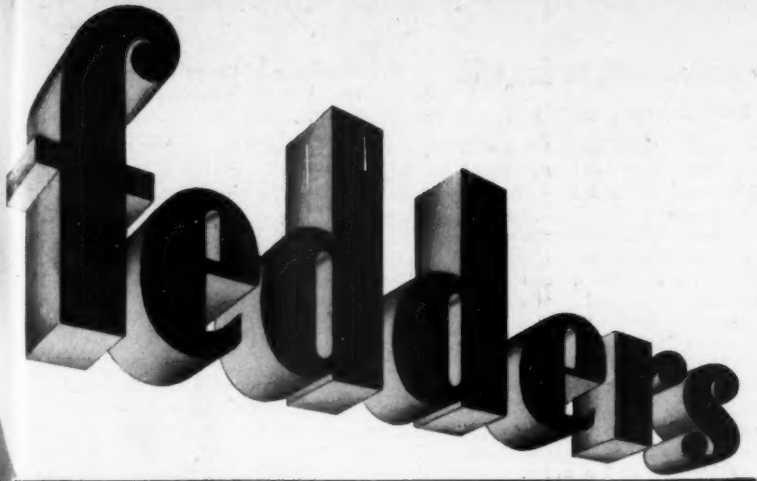
Prichett's organization, which has been in business for five years in this important southern Illinois city, does approximately 50 per cent of the commercial refrigeration service of the area, including upkeep work for ice cream firms, soda bottlers, locker plants, hotels, cafes, institutions, etc. With three service men operating three regular service trucks, the company has always operated on a "call" basis—accepting no contract work, but maintaining 24-hour service over the territory. Now, with replacement of old refrigeration "out of the picture" Prichett is planning to add another service man, and expand his facilities.

"We're operating on the idea of merchandising maintenance to the refrigeration owner who formerly was inclined to let things go," Prichett points out. "For example, during January we circularized 300 grocery stores in our territory, with a simple letter pointing out that breakdowns today mean costly delays, and possibly serious damage to refrigeration mechanism impossible to replace. This letter closed with an invitation to call us in to fix any trouble or potential source of trouble. Results were astonishing—more than half of the grocers thus contacted calling us in."

Prichett plans to use this same "Maintenance" reminder system with all prospects in his area, including owners of air conditioning systems, ice making equipment, beverage coolers, etc. "The public is highly conscious of what the war means from the refrigeration standpoint," he pointed out. "And thus, all it takes today to create service business is to simply remind the customer that the refrigeration he uses in the course of his daily business is now an almost irreplaceable asset."



FIRST COME ...



• Right now at the beginning of your selling season, Fedders puts you in the fortunate and profitable position of being able to get Unit Coolers at once. Supply is limited... order now! Send priorities if possible.

NO INCREASE IN PRICES

•

IMMEDIATE DELIVERIES
ON THIS STOCK

•

FEDDERS MANUFACTURING CO., INC.
BUFFALO

..FIRST SERVED!

STEWART-WARNER REFRIGERATOR

(Continued from page 26)

A very rough check on the cold control setting of the 1940 Dual-Temp refrigerator may be had by watching the degree of frosting of the evaporator plate. With the cold control set at "normal," the evaporator plate should show no frost at all during any part of the cycle. With the cold control set at "cold," there may be a light formation of frost along the right hand bottom edge and up the right side of the evaporator plate at the end of the running cycle, but this frost should all melt away before the unit starts up again. If the frost formation doesn't melt away between cycles, the cold control is set too cold. If no frost forms at all, the setting may be too warm.

If the operation of the refrigerator seems to indicate that the cold control is incorrectly adjusted, it may be checked as follows:

COLD CONTROL SETTINGS

Position	Cold	Normal	Cool	Vacation
Cut-in	36°	39°	42°	44°
Cut-out	29°	31°	34°	37°

Dual-Temp Operating Pressures

The sealed unit in the 1940 Dual-Temp refrigerators is equipped with shut-off valves so that gauges can be attached to observe the operating pressures.

The shut-off valves are connected differently from those in an open unit refrigerator. In an open unit refrigerator the valves allow the suction line and the input end of the condenser to be shut off so as to keep the refrigerant in the condenser and evapora-

TABLE 2—COMMON TROUBLES AND REMEDIES

REFRIGERATOR RUNS TOO MUCH OR ALL THE TIME

Possible Cause	Indication	Remedy
Low Refrigerant Charge.	Defrosting of Freezing Locker.	Locate and repair leak. Recharge.
Poor contact between cold control bulb & evaporator.	Box temperatures too low. Evaporator plate frosted.	Check cold control clamp.
Cold control set too cold.	Box temperatures too low. Evaporator plate frosted.	Adjust cold control.
Box operated in high altitudes.	If control is set at NORMAL and cold plate collects frost during the ON cycle, when refrigerator is operated at altitudes above 3000 feet, set control at VACATION or COOL for average home use.	
Defective cold control.	Box too cold. Evaporator plate collects and holds frost.	Repair or replace control.
Excessive refrigerant charge.	Suction line cold or frosted. Noisy operation.	Purge off excessive refrigerant.
DPC Valve stuck closed due to freezing of moisture.	Very low suction pressures.	Warm DPC Valve with hot wet rags.
DPC Valve stuck closed.	Same as above.	Replace DPC Valve.
Restriction in the capillary tube.	Noisy compressor and/or constant tripping of relay. High head pressures.	Inspect capillary tube for kinks or sharp bends. Replace capillary.

FOOD COMPARTMENT TOO WARM

Possible Cause	Indication	Remedy
Low refrigerant charge.	Defrosted Freezing Locker. Long running time. Low head pressures. High suction pressures.	Determine location of refrigerant leak and repair. Add refrigerant.
DPC Valve stuck partially closed due to moisture, dirt or mechanical defect.	Long running time. Very low suction pressures.	Test for moisture. Replace DPC Valve if defective.
Capillary tube stopped up or kinked.	High head pressures. Little or no refrigeration. Long running time and noisy operation.	Replace tubing assembly.

MISCELLANEOUS COMPLAINTS ON STEWART-WARNER 1940 DUAL TEMP REFRIGERATORS

Complaint	Cause or Remedy
Water dripping from evaporator plate.	Sand surface of evaporator plate.
Too much moisture in upper compartment.	Check door gasket for proper sealing.
Water from evaporator plate runs on to bottom of food compartment.	Check food door gasket. Check placement of food in upper compartment. See that trough is in proper position for conducting water from evaporator plate to drip tray. Watch for bottles, etc., being placed against evaporator plate causing water to run over shelves and down to the bottom of food compartment. Check sealing plug to see that it is in its proper position and not resting against back of evaporator plate. Caution user to leave food door closed as much as possible.
Food moulds in upper compartment. Undesirable odors.	Check Steriiamp and replace lamp if necessary. Instruct user to clean lamp at least every two weeks.
User receives shock when touching cabinet.	Partial ground of electrical circuit.
Ice forms on glass door.	Poor seal at food compartment door.

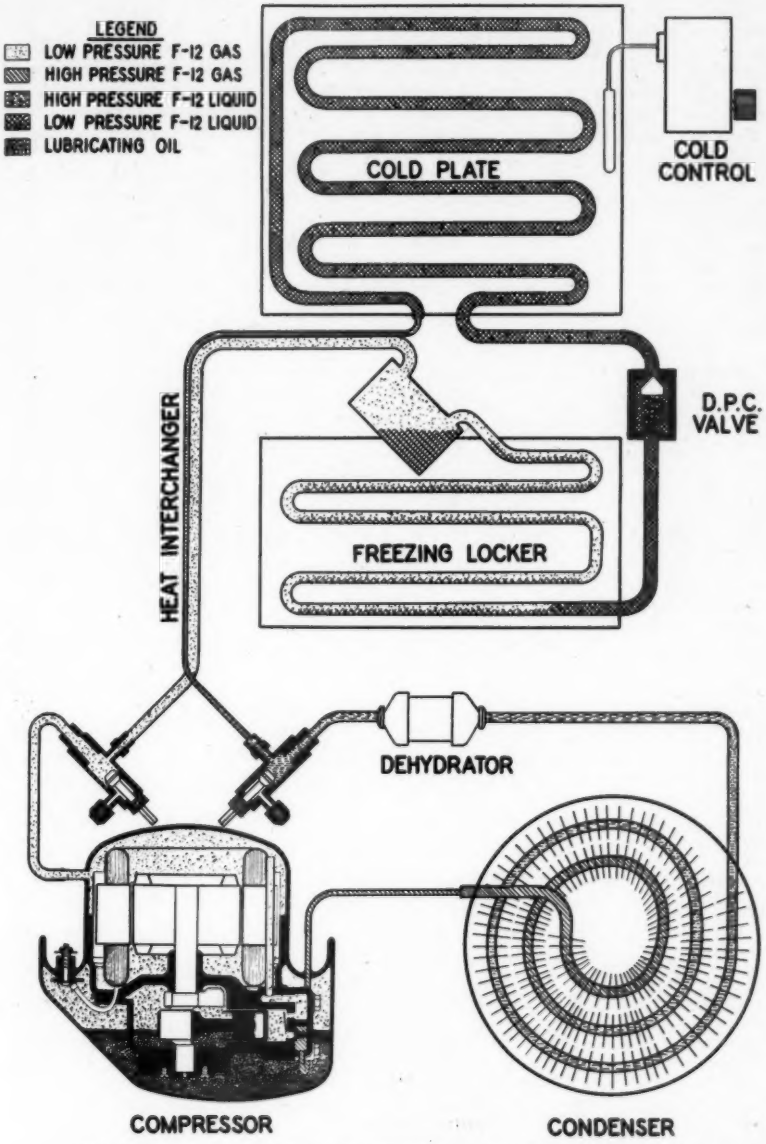


Fig. 2—Cycle of operation diagram for the late type of Dual Temp refrigerators.

tor. However, in the 1940 Dual-Temp, the valves allow the compressor and the outlet of the condenser to be shut off, keeping the refrigerant in the compressor and condenser.

Because of this arrangement, the shut-off valves must not be closed when charging the refrigerator or pumping refrigerant into a drum. They should be half way open instead. Also, it is impossible to check whether the compressor will pull a good vacuum by merely manipulating the shut-off valves and running the unit.

High Side Pressures: The high side pressure of the Dual-Temp varies widely with room temperature. In a refrigerator which has operated a few cycles so it is at normal operating temperature the high side pressures will be about as indicated in Table 3 during the running cycle.

TABLE 3—HIGH SIDE PRESSURES

Room Temp.	Approx. Pressure
70°	113 to 120
75°	120 to 127
80°	128 to 135
85°	135 to 142
90°	143 to 150
95°	150 to 157
100°	158 to 165

During the off period, the high side pressure will drop rapidly until it is about 15 to 25 lbs. higher than the low side pressure.

On the initial pull down, or if there is excessive load for any other reason, the high side pressure will be higher than indicated above.

Low Side Pressures: Cut-out pressure is fairly independent of room temperature and will be approximately 5 to 7 lbs. with control set at "normal." Cut-in pressure varies slightly with room temperature. Will be between 10 to 15 lbs. Higher room temperatures result in a lower cut-in pressure.

Dual-Temp Refrigerant Charge

Correct Refrigerant Charge: The Model 660 Dual-Temp refrigerator is charged with 14 ounces of Freon 12, and the Model 860 with 15 ounces. The amount of refrigerant in the system is very critical and any deviation of more than one ounce from the correct amount will cause improper operation.

When the amount of refrigerant in the system is correct, the suction line will be practically at room temperature where it comes from the cabinet during the entire running period, and the frozen food compartment will be frosted on the bottom, back and top.

Checking Amount of Refrigerant in System: If there is an overcharge of refrigerant, the suction line will frost when the unit runs, especially at the beginning of the running cycle.

If the system contains less than the correct charge of refrigerant, the symptoms will depend on the amount of shortage but in all cases the Freezing Locker will be partially or totally defrosted. The various indications are as follows:

1. With only a slight refrigerant shortage, the top of the Freezing Locker will defrost at the left end. As more refrigerant leaks out, the defrosted area on the top will get larger, spreading towards the right. As the charge continues to leak out, the bottom of the Freezing Locker will begin defrosting on the right side and work towards the left. If there is only just enough refrigerant to fill the evaporator plate in the upper compartment, the Freezing Locker may be completely defrosted but the upper compartment temperature will be normal and the running time will be short.
2. If the shortage of refrigerant is quite substantial, the Freezing Locker will be defrosted, running time will be excessive and part of the evaporator plate in the upper compartment may frost up.
3. If practically all of the refrigerant has leaked out, the refrigerator may run continuously and there will be very little or no refrigeration taking place. Under these conditions, head pressure will be low.

(To be continued in next issue)

S S S

Orville Root
Bedford, Indiana

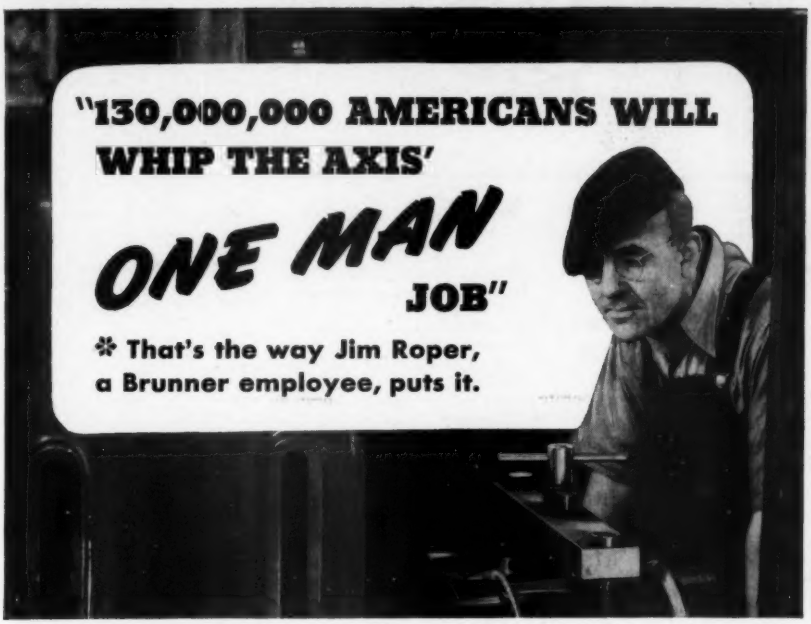
It is certainly very helpful to me.

Edgar A. Poole
New Brighton, Pennsylvania

Don't ever stop sending THE REFRIGERATION SERVICE ENGINEER, no matter how late I am. I couldn't be without it.

E. O. Hense
Chicago, Illinois

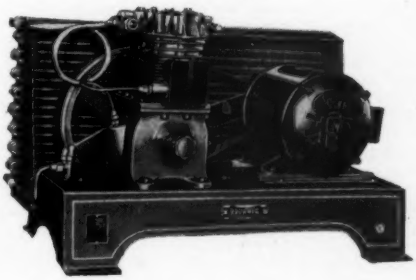
Your magazine don't need "high powered" salesmanship—it's plenty needy to all.



"Today, as every day, Americans are working together towards a common goal... security. We men working in refrigeration are proud of our part in defense. We pledge ourselves to do our utmost in providing and servicing refrigeration equipment to preserve foods and prevent spoilage. Combine our work with millions of other American workers and we have a team that will whip the Axis."

Brunner, too, is doing its part to meet the urgent demand for dependable refrigeration equipment and a large part of the credit goes to Jim Roper and other employees whose experience, combined with pride of workmanship, is one reason why the food industries depend on Brunner condensing units. Brunner Manufacturing Company, Utica, New York, U. S. A.

BRUNNER
COMMERCIAL REFRIGERATION



✲ A company is nothing more than a group of men working toward a common goal. When their personalities, beliefs and purposes are combined, company character is formed. Jim Roper, milling machine operator, explains Brunner's new responsibility.

New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Substitute For Neoprene Door Gasket

A SUBSTITUTE for neoprene that can be used for refrigerator door gaskets has been developed by Jarrow Products, Chicago, according to Harry Jarrow, owner. "This new product, which we have christened Jarene, is superior to neoprene in many respects as a gasket material," said Mr. Jarrow. "Best of all, it does not contain any materials which at present are classed as critical. Tests have shown," he continued, "that Jarene is 100% grease proof, making it ideal. It is also unaffected by most acids. Applied to a gasket fabric, it provides a bond that will not permit flaking."

"We at Jarrow Products are particularly pleased, because of its tough pliable surface and the remarkable manner in which it resists abrasion. It is very possible that Jarene will be found adaptable to other uses than as a door gasket covering, and to that end we are naturally directing our energies. However, it is now available only in a Jarrow Gasket" he said.

"I have always insisted that national emergencies and shortages would spur American inventive genius. Our country's history sparkles with new inventions developed during periods of stress. I am confident that after the war is over that innumerable products now classed as substitutes will become standard because of lower cost and actual superiority," he said.

Blowing A Trouble Away

THE drip pan under small air-cooling units is usually more than ample for all normal conditions. However, in a few localities the humidity is sometimes so high that water is squeezed out of the air faster than it can evaporate. The problem was to get rid of this water without the nuisance of a drain connection.

One day a Westinghouse engineer stood beside one of these machines in the laboratory. Puzzling over this problem, he chanced to touch the blade of a screwdriver to the water in the drip pan in front of the condenser fan. To his surprise water climbed up the blade, was blown off in a fine spray and evaporated. Here was the answer to the problem. Air blowing past the screwdriver standing at an acute angle created behind the blade a vacuum that drew the water upward to form a spray. Now, by fastening a flat curved strip of metal so that one end dips in the tray, excess water is blown into a spray as rapidly as it collects.

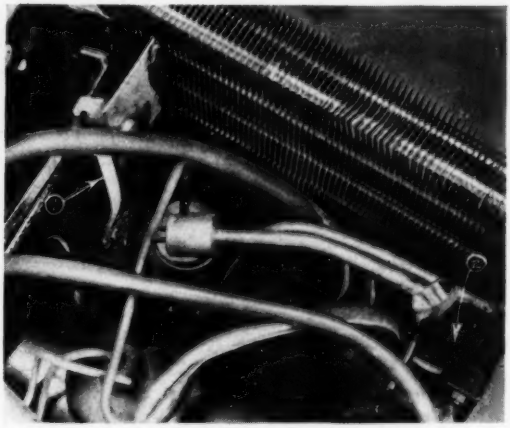


Fig. 1—The simple expedient of attaching a metal strip to the drip pan has eliminated the water-collecting nuisance under small air-cooling units. Strips are indicated by arrows numbered one and two.

Reclaimed Rubber V-Belts

AMERICA'S automobiles, washing machines, oil burners and other appliances, which last year required 22,000,000 replacement V-belts, will not break down for lack of new belts, if military requirements will permit use of reclaimed rubber for this purpose.

If the results of the OPM's study of the over-all rubber situation permit, the B. F. Goodrich Company will market Victory V-belts made entirely of reclaimed rubber which will give 80 per cent of customary service without drawing on the nation's crude rubber stock-pile, it was announced by William S. Richardson, general manager of the Industrial Products Division of the company.

"The Chart is a necessary part of my equipment"

so says this service man

• Now that the Calculator is being put to the test of practical use in the field, we have had a number of letters from service men testifying to its value. This one is typical.

Sometime ago I purchased a Head-Back Pressure Calculator from you, but misplaced it. The chart is a necessary part of my equipmemt, so please send me another.

J. V. Farmer

WRIGHT'S

H. B. P.

CALCULATOR

The purpose of the Head-Back Pressure Calculator is to quickly determine the proper head pressure, for the following refrigerants when the suction pressure, room temperature or mean water temperature is known.

Carrene	Methyl
Isobutane	Freon or F-12
Sulphur Dioxide	Ammonia
Carbon Dioxide	

Actual Size 3½" x 3½".

A Vestpocket Tool Every Service Man Should Carry

A number of troubles can be detected by comparison of the existing head pressure and what the head pressure should be, but in the past there has been no convenient method available to the service engineer to determine what the correct head pressure should be. Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all determine the proper head pressure. It is not practical to depend on one's memory of other similar conditions or to just use snap judgment when this handy calculator gives you the correct answer so easily. Send for it today! Sturdily constructed, with oil-proof finish, for on-the-job use.

POSTPAID $1.00

NICKERSON & COLLINS CO.

435 N. WALLER AVE., CHICAGO

"This development assures continued operation of civilian cars and appliances while conserving rubber vitally needed for war equipment," Richardson said. "Last year 2,325,000 pounds of natural rubber went into replacement V-belts for automobiles and 2,260,000 pounds into replacements for domestic appliances," he added.

"The B. F. Goodrich Company, which is one of the largest manufacturers of reclaimed rubber, has thoroughly tested these Victory V-belts," Mr. Richardson said, "and results show service equivalent to 80 per cent of its standard V-belts formerly made of crude rubber.

"This means that the industry and the public can cooperate in the nation's rubber conservation program and still keep in operation automobiles that need fan belts, as well as washing machines, refrigerators, oil burners, ironers, home machine tools, air-conditioners, water pumps, and thousands of other typically American labor-saving devices which play vital roles in the everyday lives of Mr. and Mrs. Average American. This development will mean the difference between operating home appliances or not operating them in the months to come."

Blackout Bulb

DESIGNED for blackout lighting in air raids, the new Wabash Blackout bulb just announced by the Wabash Appliance Corporation, Brooklyn, N. Y., provides downlighting in a soft beam of blue light that is safe for indoor visibility during blackouts. The bulb is lined inside with a pure silver reflector lining that hides all filament glare and projects the light downward. Light leaks are prevented by a black silicate coating that covers the bulb up to the extreme lighting end which is a deep blue. The new bulb consumes 25 watts and will list at 45c.

"Frostrode" Process for Refrigerated Welding

THE acquisition of all patent, manufacturing and sales rights to the new type of refrigerating units for welding machines originally developed by Progressive Welder Company has been announced by the Weltronic Corporation, — East Outer Drive, Detroit. Under the new trade name of "Frostrode" the units will be manufactured and marketed to welding equipment manufacturers hereafter by Weltronic's new Frostrode Division.

Sales of the "Frostrode" units to users will be handled by manufacturers of welding equipment and the York Ice Machinery Company and installations will be under the supervision of either Weltronic Corporation, York Ice Machinery Company, or the welding equipment manufacturers.

Service of the units will be handled by the nearest York Ice Machinery representatives.

The new Weltronic "Frostrode" units are available in five standard sizes, ranging in their capacity from light steel spot welding for the small unit, to the largest unit for use with either a heavy steel welder or a bank of eight aluminum welders. Completely self-contained, the refrigerating units are quite simple to install.

The Weltronic "Frostrode" welding process has been developed primarily for those tough welding jobs where water-cooling has proven inadequate, such as in the welding of aluminum or heavy steel sections. The units, however, make possible a material reduction in operating costs for resistance welding equipment of all types.

The new units make practical continuous welding of four to ten times as many spots in aluminum without requiring point dressing. Aluminum is one of the most critical metals to weld due to the low electrical resistance and high current values required, with the resulting inclination towards alloying of the metal with the electrode because of the high heat generated.

In the welding of heavy steel sections the long weld time and high point pressure required results in high surface heat with consequent mushrooming of electrodes, short electrode life, faulty spots and frequent and protracted "down time" for the machines.

In both these instances the "Frostrode" cooling process removes this heat as it is generated, decreasing pick-up of the aluminum and the heat-induced mushrooming of the electrodes.

When used in connection with a spot welding machine, the new unit reduces electrode temperature to a point where elctrodes will be continuously covered with frost in spite of the high heat necessary to produce a weld. As a result, the life of the point is so increased that ten-minute runs, at 100 welds a minute, on aluminum, without point dressing are not unusual, even on tough jobs.

"Frostrode" units materially reduce water consumption since water is used only "as required" to maintain brine temperature.

All types of Weltronic "Frostrode" units are provided with automatic thermostatic control, built-in dehydrator, heat exchanger, external indicating thermometer, highest efficiency pump with variable pressure and all standard safety appliances.

FAMOUS HENRY "FIRSTS"

1 The Packless Valve with Ports-in-Line and Balanced-Action. **2** The Wing Cap Valve with Steel Companion Flanges and Separable Brass or Steel Sleeves. **3** The Automatic Pressure Relief Valve with Push Rod for Emergency Re-seating. **4** The Permanent-Mold Iron Compressor Shut-off Valve. **5** The Distortion-Proof Flange for Dryers and Strainers. **6** The One-Piece Drawn Brass Shell for Dryers and Strainers. **7** The Welded Steel "Y" Strainer. **8** The Abso-Dry Pressure Sealed Dehydrator. **9** The Dispersion Tube for Dryers. **10** The Dehydratector—the Dryer with the Built-in Liquid Sight Port.

YOU CAN COUNT ON HENRY FOR MORE "FIRSTS" IN THE FUTURE!

HENRY VALVE CO.

1001-1019 NORTH SPAULDING AVENUE • CHICAGO

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

IS MY FACE RED

QUESTION BOX: From my study of your little magazine over a period of 3 years I gather that most of your readers are service men working in the so-called low pressure field, and that quite often they are confronted by some unfamiliar problem in servicing ammonia equipment. I have been amused at times at your answers to some of the questions put to you regarding such equipment but your answer to question 475 in your January issue is far from amusing in that your advice is misleading and certainly liable to lead the poor man into a mess and make him afraid and distrustful of ammonia equipment.

The problem is how to repair a split in a return bend on a galvanized coil. This is a very common happening. Some butcher whacks the coil with the back of a cleaver to knock the frost off and the coil opens up on the bend. Your man is concerned about the strength of the weld on galvanized pipe and about the danger of an explosion if the split is welded. From many years experience with ammonia let me say that the danger of an explosion while making such a weld on an old coil with oil in it is so remote as to be beyond consideration. Your recommendations about getting the ammonia out of the coil, flushing out the coil with water and blowing it out with CO_2 is positively fantastic! What in the world would anyone want to go through all that monkey business for? Suppose you had a similar split on a return bend on a Freon coil, how would you go about repairing it? You would pump the pressure down to zero, then you would solder the split over. Well, for the love of Pete, tell the poor man to do the same with the ammonia coil, only weld it. Pump the pressure down to atmospheric balance, no pressure, no vacuum, then weld the split. He won't even see any oil unless he burns a hole clear through the pipe and that is not necessary. Another little trick. The galvanizing will be burnt off the pipe, of course and this will rust afterward. But the weld and burnt spot can be rust-proofed easily. While the weld is still hot, rub with a bar of half-and-half solder, then rub thoroughly with a wire brush. No flux, no special cleaning, just solder and wire brush.

Please stop scaring the boys about ammonia. The stuff stinks something fierce but it won't kill people any quicker than any other gas.

LeRoy Williamson,
Portland, Oregon.

S S S

NOISY COMPRESSOR AND LEAKY FLOAT

QUESTION 476: I assembled a condensing unit of my own, using a Chieftain twin cylinder compressor and made a remote installation, having this unit in the basement which would be about fifteen feet from the box upstairs. The results were very good until the shaft seal sprung a leak, at which I was able to get a replacement compressor according to the warranty applying in connection with the policy of Tecumseh.

Again the system functioned very well with an "on cycle" of from two to three minutes and an "off" of around fifteen to twenty minutes. Then a noise appeared which I at first thought to be about the belt somewhere. I finally decided that it was not the belt at all, but instead it seemed to be in the compressor itself. It is very hard to describe this noise since I have not heard anything just like it. After the compressor starts it will run for about a half a minute normally and then it begins with this noise which sounds somewhat like oil pumping and yet there is sort of a screech combined with it which appears to occur at every stroke of the pistons or perhaps at times one piston stroke can be counted. My dealer has checked the compressor and says there is nothing wrong. He advised me to look at other points in the unit for the noise and the expansion valve adjustment which I have done, but to no avail.

The suction pressure is two pounds gauge and the condenser pressure around 90 pounds. There is no frost-back to the compressor, so apparently no liquid is getting through and causing oil slugging. The noise is consistent day by day and to further describe it, I might say that it is more or less of a metallic sound.

Defense for Babies too!

Defenders of America's future—the babies of today!

Let us help prepare them for their great responsibility by protecting their health now.

The refrigeration industry is doing its part by keeping fresh the milk and food that is so important to the proper growth of these young Americans.

TECUMSEH PRODUCTS CO. TECUMSEH MICHIGAN

Chieftain

Could you suggest any possible cause for this trouble? It has been suggested that there might be moisture in the system but I do not understand how this would cause the noise.

A Kelvinator with a low side float runs continuously with some ice on the evaporator. The suction line is frosted back to the compressor and even ice is built up ¼ inch thick. The compressor is cold and sweaty. Is this a sign of a stuck open valve or the like? I flushed it twice by pumping gas back to the receiver, then letting it through but this did not remedy the condition. In this valve the header is welded to the body of the float tank. In case this is an open valve, what procedure is usually followed to remedy the condition?

ANSWER: It is awfully difficult to describe noises in compressors in such a way that anyone else can get any idea of that noise. It is difficult enough to try and locate the trouble when listening to the noise yourself but it's doubly so when trying to determine it from someone else's description.

I can only make two guesses at the possible cause of this noise and, I really mean guesses. The first is that the seal of the compressor may not be getting sufficient lubrication so that the outer part of it is running dry and squeaking. This usually causes more or less continuous squeaking, however, and could not be described as intermittent with the stroke of the piston.

May Have Too Much Oil

The other possibility is that the system now contains too much oil and the noise you hear is oil being forced through the discharge valves. Usually a certain amount of oil is pumped out of the compressor and remains in the system circulating with the refrigerant.

When you removed your first compressor it is probable that some of its oil was left in the system and since the second compressor would contain a full charge of oil, it seems possible that the system would now contain an overcharge. Whether or not this overcharge is sufficient to cause the noise is difficult to say but as I stated at first, it is a guess.

I can't believe that noises of this type could be caused by moisture in the system and if it is in the belt you could temporarily overcome it by holding a cake of soap to each side of the belt, thus lubricating it sufficiently to remove the noise. This at least might be worth a try to satisfy yourself as to whether or not the noise is in the belt.

There are other places where this noise could come from such as the motor mountings which no doubt are rubber and they may be causing a certain amount of squeaking in the slight motion of the motor in its mountings. Loose base bolts and other such points are another source but I presume that you have checked all of these little items and have found them satisfactory.

With regard to the Kelvinator, these floats I understand are not welded but are soft-soldered so that the header can be removed by heating to the point of melting the solder. However, it is my understanding that it is not necessary to remove the header to accomplish any adjustments in the floats.

There is a replaceable needle and seat cartridge which can be purchased from the Kelvinator Company for these floats which will overcome any leakage at that point. If the float requires calibrating, the needle in the cartridge can be lengthened or shortened in order to raise or lower the level at which the float closes off the needle valve. The symptoms indicate that the float is either leaking or is out of calibration.

CHANGING A MAJESTIC TWIN UNIT TO A SINGLE UNIT

QUESTION 477: I have a Majestic cabinet with twin compressors which I would like to change over to remote with one compressor working on two coils. I intend to use a small thermostatic expansion valve on each coil and a low pressure control on the machine, thereby discontinuing the twin compressor units, using only evaporators.

I would like to know if the oil cups in the evaporators would give trouble if the liquid level in the evaporators was raised enough to lift the bottom of the cup up against the suction tube thus cutting off the return of vapor to the machine.

Do you think the above ideas for the changeover will give satisfactory operation? If not, what would be your suggestions for the changeover of the system?

ANSWER: I really don't know what action you may expect from the installation of a thermostatic expansion valve on a Majestic coil. However, it would seem to me that this action may be quite erratic. The oil cup which floats on top of the refrigerant in the original Majestic setup is intended as an oil skimmer which permits the collection of oil floating on top of the refrigerant to be returned to the compressor.

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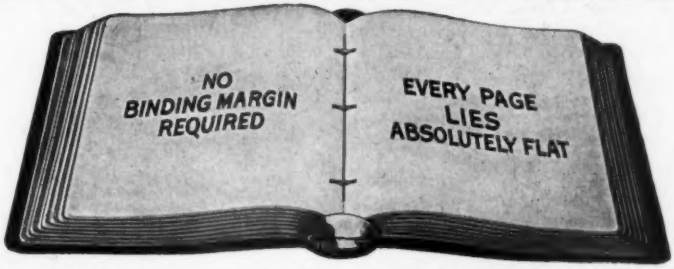

Every issue of this magazine will have valuable information which you will want to retain for future reference.

Here is a handy, substantial binder that permits you to add each copy readily as it is received. The binder is so constructed that regardless of the number of issues, every page lies flat and is easily read.

Holds twelve issues—an entire year's supply. No hunting around for lost or missing issues. The entire year's edition is always handy.

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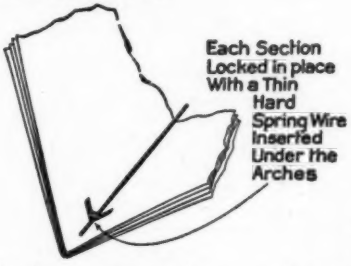

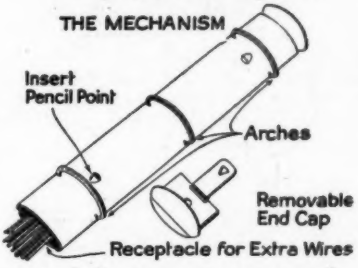

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The Majestic, of course, employed a high side float as the refrigerant control and in this way it was possible to definitely limit the refrigerant level in the evaporator. When you install a thermostatic expansion valve you will have no control over the refrigerant level except when that level reaches the point where it floods into the suction line and is felt by the power element of the thermostatic valve. The setup of this evaporator would indicate that this oil cup would become filled with refrigerant and the refrigerant would be drawn into the suction line.

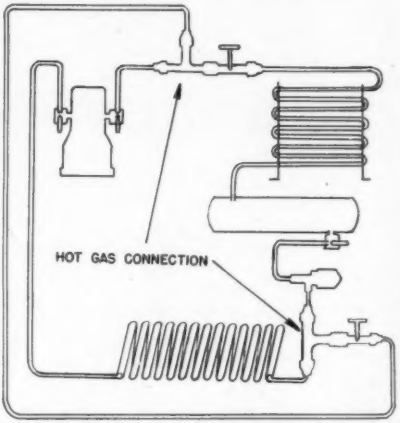
Whether or not your thermostatic valve will control properly with the intermittent slugs of the refrigerant passing into the line from this cup is problematical. It would appear, however, as though the oil cup tends to take the control away from the power element or the thermostatic bulb while at the same time there is no means of limiting the liquid level in the evaporator so that the oil cup will function in its proper manner.

I would think that instead of using a thermostatic expansion valve you would secure better operation if you connected both of these coils in multiple, or in other words, tie them across so that only one liquid line and one suction line serves them both. Then install a high side float to control the refrigerant to both. Any one of the replacement high side floats found on the market should be satisfactory for this purpose. These evaporators are designed for high side float operation and undoubtedly you would have better success with them than with a thermostatic valve. The float could be installed in the machine compartment and the unit can be controlled by a low pressure switch as you have suggested. The machine, of course, could be located in any convenient place in or near the cabinet.

DEFROSTING MULTI-PASS COIL

Question 478: This is a Mills Novelty Company air cooled condensing unit, Model FG8AM, Serial 135, 2 H.P., Freon charged. This unit air conditions a meat cooler. The evaporator and blower are built in a chamber with two short ducts, about two feet long, that enter through the ceiling of the cooler through which air is circulated. The dimensions of the cooler are: 7½′ high, 9′ long, 7′ wide. These are the inside dimensions. The insulation is 4″ cork, ½″ plaster inside and 1″ board outside. The surrounding temperatures are as follows: 2 walls have 40°F (the meat cooler in question is between 2 coolers where the temperature is 40°F), 1 wall with the door is in a hallway where the temperature is 80°F, the outside wall is 100° F, the ceiling is 105° F. The duct chamber and ducts have 4″ cork only and are located directly above the cooler in the attic where the temperature is 105° F. The unit is also in the attic about 3′ away from the ducts chamber and the incoming air which cools the condenser is 95° F. The system has an Alco thermostatic expansion valve, type TO6, Con. 7FZ, tons 2. The required temperature in the cooler is 25° F.

This temperature I have obtained but the evaporator frosts up thickly and needs frequent defrosting. For this purpose I want to make a connection to defrost with hot gas (to save time). On the enclosed sketch of the installation is shown within the black



pencil lines where I broke the lines in order to make the necessary connections for the hot gas defroster and parts used.

The expansion valve has 5 feeders of which only one is connected to the valve with a flare nut, the other 4 are welded on one side to the valve and the other to the evaporator.

I shall appreciate your setting me right on the following questions:

1. What is the cause of accumulating so much ice on the evaporator?
2. Is the sketch for the installation of the hot gas line correct? If not, please return same with corrections.
3. Is the line which is connected to the valve with a flare nut the liquid line?
4. Is the expanding gas leaving the expansion valve through the other 4 feeders? If so, is it impossible to install a valve for directing the hot gas for defrosting.

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The Secretary of the Navy, Frank Knox, recently said "in the present defense program we've asked for miracles of industrial production and, what's more, we're getting them." The workers of the Mueller Brass Co., who have executed naval munitions contracts for the past 20 or 25 years, have now pledged themselves to continue their unceasing "all-out" effort to help achieve the American "miracles of industrial production" which are so essential to the ultimate victory of our armed forces.

The men and women of this plant, who, a few short weeks ago were busily engaged in the manufacture of Valves and Fittings for Mechanical Refrigeration, and a host of other brass and copper products, are now devoting their full time, 24 hours a day, 7 days a week, to the production of Army and Navy requirements.

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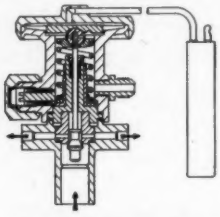
Mueller Brass Co.

Port Huron, Mich.

5. How can this valve be replaced, say for a Detroit valve?

I don't know what make the evaporator is and how the liquid line is connected to it since it is enclosed in cork and is not accessible.

ANSWER: 1. If the box temperature is 25° F., the coil temperature is probably between 0° F. and 15° F. This means then that the coil temperature is never permitted to rise to a defrosting temperature and frost will naturally accumulate. The rapidity of frost accumulation will depend on the amount of humidity in the box.



The type of expansion valve made by Alco Valve Co., which combines a Thermostatic valve with a distribution header.

Hot Gas Defrosting Not Practical on This Type of Coil

2. The points of connection in your hot gas defrosting hookup are correct but the location of the valves is not right. Instead of locating your hand valve between the "T" and the condenser as shown in the sketch, it should be located in the hot gas line near the "T." The other hand valve should be located between the expansion valve and the "T." The reason for these locations is this: You will not be able to operate the compressor while you are defrosting the coil. If you do attempt to operate the compressor during this time, any liquid contained in the coil when defrosting is begun, will be slugged through the compressor. Hot gas defrosting systems on single coil installations are not very successful because they are dependent entirely on the amount of hot vapors contained in the condenser when defrosting is begun to do all the work. There is not sufficient vapor to do this and the operation must be repeated so often that it takes more time than it is worth. For this reason I would not recommend the use of hot gas defrosting.

3. The line connected to the expansion valve with a flare nut is probably an equalizer line. The liquid line enters these valves at the bottom of the flange or disc which contains the four feeders.

4. Apparently the coil on this installation is what is known as a multi-pass coil and it is therefore necessary to have some type of distributing header at the valve which will evenly distribute the refrigerant through each of the passes in the coil. The expansion valve you describe is what might be termed a combination expansion valve and distributing header. Its construction and operation is thoroughly described on Page 19 of the April, 1941, issue of THE REFRIGERATION SERVICE ENGINEER. There is also an illustration of the valve connected to a coil on Page 22. It might be possible to connect a hot gas line into this coil but again I am doubtful of the success you would obtain with the hookup.

Valve Cannot Be Replaced

5. This valve cannot be replaced with another make unless you went to the expense of providing in addition, one of the various types of distributing headers to which the valve could be connected. After this work had been done it is doubtful if you would secure as satisfactory operation as you now obtain. To overcome your defrosting problem on this particular setup I would suggest as the best means that you re-arrange the insulation around the coil in such a way that it can be opened up to the atmosphere for defrosting. You have an ideal situation for this method inasmuch as the coil is installed outside of the cooler and is connected to the cooler with air ducts. It should not be too difficult to provide dampers in the air ducts which could be shut off during the defrosting period and to provide two doors in the outside around the coil itself which could be opened permitting the circulation of warm air around the coil for defrosting.

S S S

L. F. FEDDERS, DECEASED

AS this issue goes to press, it is learned that Louis F. Fedders, president and treasurer of the Fedders Manufacturing Co., Inc., for 22 years, died February 4 in his Buffalo home after a year's illness. The company is a big producer of refrigerating and air conditioning equipment. Mr. Fedders went to work with the company when he was 16 and later succeeded his father as president. The concern grew from a small enterprise with a few employees to one with 1,200 employees with plants in Buffalo and Owosso, Mich.

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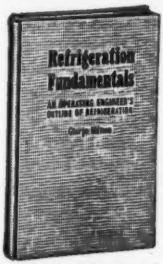

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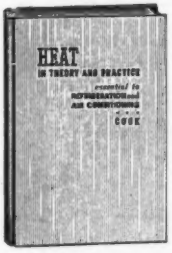

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RSES Convention Dates May Be Announced Soon

Convention Probably in March

IT has been hoped that announcement of the convention dates of the Refrigeration Service Engineers Society would have been announced prior to this date. Several important orders affecting service and maintenance work were expected to be issued from Washington and much of this information, it was hoped, would be available for discussion at the convention. Industry Advisory Committee meetings, which were to be called to discuss the refrigeration orders have been postponed on two occasions. No announcement as to when the meeting may be held has been forthcoming, as yet. It is felt that in view of this uncertainty it may be well to hold the annual convention as soon as possible.

As soon as definite convention dates are determined, all members of the RSES will be informed by bulletin. The convention, however, invites all service men, members and non-members alike, to participate in the educational program and discussions that will undoubtedly provide one of the most interesting and informative conventions the Society has held. It is expected that this meeting will, as originally planned, meet at the same time as the Refrigeration Equipment Manufacturers Association and the National Refrigeration Supply Jobbers Association, providing an All Industry meeting.

No relief has been provided, as yet, in respect to securing repairs for domestic or retail outlets. The only available relief on the critical materials is under the P-100 order, which superseded the original P-22 order, extending an A-10 preference priority rating to the industry.

This provides for the securing of parts and supplies for any type of refrigeration equipment now installed for all classifications of wholesalers excepting retail and domestic users.

One of the important points to be clarified in the immediate future is that of securing new tires or retreading old tires. This is an all important subject and it is reported that the Office of Price Administration is endeavoring to provide relief for industries not now included in the tire rationing order. The matter of securing a definite understanding in respect to what provision can be made for those men engaged in the servicing and maintenance of refrigeration equipment is expected to be made soon.

CANADIAN CHAPTERS CONSIDER PROBLEMS

THE Canadian chapters find themselves in much the same position as other chapters in the situation created by the shortage of vital materials. That they may be better organized to cope with the situation, an interprovincial organization has been formed with representatives of each chapter represented in any action taken. A meeting of January 30th, called by the Ontario Maple Leaf Chapter, was primarily for the purpose of considering their problem.

Harry Parish was asked to speak on the progress of the brief being presented to Ottawa. He pointed out that the brief is designed to prove to Ottawa the importance of the refrigeration service industry and to offer the cooperation of the service group to the Advisory Board through which it is hoped membership on the board would be gained. At the present time the Advisory Board is made up of all branches of refrigeration except service. The brief, he stated, will conform to the original written by H. T. McDermott, and presented to Washington. Necessary changes are being made to fit more favorably into the Canadian government policy.

It was agreed that if membership on the board was gained, Harry Parish should be the representative for the service group.

SMORGASBORD PARTY

MEMBERS of the Illinois Valley Chapter and the Ladies Auxiliary held a Smorgasbord Party at the Jefferson Hotel in Peoria, on Sunday, January 25th. Guests included Mr. and Mrs. Richard Potter, Mr. and Mrs. James Kline, and Mr. and Mrs. Archie Fait of the Springfield Chapter.

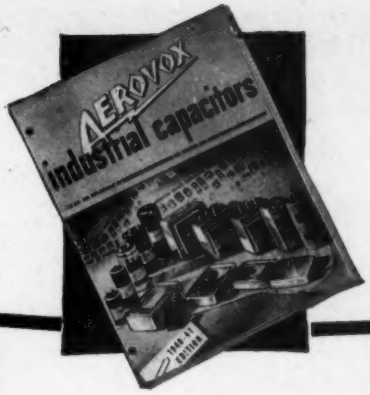
Considerable time was spent in eating and enjoying the large variety of tempting and delicious food. After everyone was filled to capacity, the party adjourned to private rooms. The men held a short business session and the ladies played pinochle.

All those present spent an enjoyable afternoon and evening.

R.S.E.S. Chapter Notes

NIAGARA FRONTIER CHAPTER

January 7—The meeting was held at Club Como in Buffalo. John K. Bush presided. One of the first orders of business was the drawing up of the resolution offering the



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services of the chapter and its members to Buffalo and neighboring towns in its defense activities. The secretary was instructed to write the Buffalo Defense Council, fire and police departments, the mayor and the Erie County Defense Council, offering these services. The balance of the evening was taken up with the annual election of officers. Those elected were as follows: *President,* A. H. Keirn; *Vice-President,* L. McCormick; *Secretary-Treasurer,* William Goeckel; *Sergeant-at-Arms,* M. Bernstone; *Board of Directors,* John K. Bush, B. Zeigler, R. Davis; Director of the New York State Association, John K. Bush.

January 21—The annual banquet of the chapter was held on this date at the Club Como and one of the features of the evening was the introduction and installation of the newly elected officers. John K. Bush presented the new president and the new president then presented his fellow officers. Each was instructed in his new duties and the office turned over to him. Mr. A. H. Keirn, during the evening, presented John K. Bush with an engraved R.S.E.S. pin as a token of appreciation for the work he had done in the chapter. Several pictures were taken during the evening and a floor show provided some enjoyable entertainment after the banquet.

DAYTON CHAPTER

In a recent meeting of the chapter, new officers for the 1942 fiscal year were elected as follows: *President,* George Click, *1st Vice-president,* R. F. Yauch; *2nd Vice-president,* R. E. Wagner; *Secretary,* Delbert R. Goll; *Treasurer,* G. H. Brock; *Sergeant-at-Arms,* G. W. Perrine; *Board of Directors,* H. R. Shoupp, G. G. Orsborn, R. J. Brown; *Educational Chairman,* H. R. Shoupp.

January 8—The meeting was called to order by George Click in the absence of Mr. Orsborn. The newly elected officers were installed and the regular routine of business got under way. One of the first orders of business was the adoption of a resolution offering the services of the chapter and its members to the State Defense Board and to attach a list of the names and addresses of all the members to the letter so that they could be listed on call. On the educational program, Mr. Anderson of the Automatic Products Company gave an interesting discussion on oil control valves.

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MOUNT ROYAL CHAPTER

December 12—During the business session of the evening, J. S. St-Laurent read a letter from Mrs. C. Pigeon thanking the chapter for their presentation of $10.00 to her for her efforts in the association work. Mr. St-Laurent also suggested that an annual supper and dance be given during the month of January. Mr. Fabien, member of the Nominating Committee, presented a list of those he felt suitable for election in the forthcoming annual election of officers. Members were notified that the election would take place at the next regular meeting. On the educational program Mr. Davis of the Davis Automatic Controls, Toronto, Ontario, presented a talk on thermostatic expansion valves, proper method of installation, some troubles that may occur and their remedy. Many questions were asked from the floor and satisfactorily answered by Mr. Davis.

January 23—The greater part of the evening was taken up with the annual election of officers. Those elected are as follows: *President,* J. Bruno Lacerte; *First Vice-president,* J. M. Turner; *Second Vice-president,* J. A. St-Laurent; *Corresponding Secretary,* A. W. Dancey; *Recording Secretary,* Jos. Galley; *Treasurer,* Philip Tremblay; *Sergeant-at-Arms,* Adrien Gravel; *Chairman, Educational Committee,* Gordon O. Roe; *Chairman, Entertainment Committee,* Napoleon Brossoit; *Chairman, Membership Committee,* Raymond Brault; *Board of Directors,* R. McCullough, J. D. Ross, C. A. Fabien, L. J. Boucher, J. A. Tremblay. The meeting was held at the Windsor Hotel and was very well attended.

FURNITURE CITY CHAPTER

January 16—The meeting was called for the purpose of discussing the future course of the chapter. Activities had waned in the past to the extent where some new course of action had to be taken. During the course of the evening, the members voted unanimously in favor of continuing the organization, but due to lack of interesting material affecting the group locally, it was decided to reduce the number of meetings per year. The first order of business was the election of new officers. They are as follows: *President,* William Wilbur; *Vice-president,* M. Bontekoe; *Secretary,* Ray P. Falicki; *Treasurer,* Claude V. Jackson; *Board of Directors,* Cecil Simpson, Vor Udell, Bud Post; *Educational Chairman,* Lester Pool. Next, it was

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voted to hold four regular meetings a year and to call special meetings whenever the occasion arose. It was also felt advisable to make each of the regular meetings a dinner meeting, this adding a social touch and providing a better opportunity of getting acquainted. Members expressed their desire to secure more information on priorities and present-day materials situation.

CENTRAL NEW YORK CHAPTER

January 14—The meeting was called to order by President Weldon Andrews and the secretary's report was read and accepted. Various holiday greetings from chapters were read along with the correspondence and other matters coming before the chapter. A motion was made by E. Miller, duly seconded and passed that a resolution offering the cooperation of the chapter to the Syracuse Council of Defense be drawn up and presented to the local Chairman of the Defense Board. In the resolution it was pointed out that inasmuch as members of the chapter were thoroughly familiar with the handling of toxic and non-toxic gases used in refrigerating systems, and inasmuch as the release of these gases endangers the lives of people in the vicinity and increases fire hazards, the members of the chapter would be best fitted to cope with the situation in cooperation with the fire departments and police departments in the event of air raids.

January 28—The meeting was called to order by President Andrews and during the course of the business session Mr. Andrews offered to use his influence in securing the Empire Hotel meeting rooms for future meetings. The meeting asked Mr. Andrews to do so and the members voted to pay the rent on the present meeting room upon presentation of the bill. Mr. Just spoke on the possibility of membership advertising in which the chapter would run joint ads covering its members.

COLUMBUS CHAPTER

December 18—The annual Christmas party was held on this date and the price of admission to the party was a child's toy. Many toys were assembled at the party and on December 19th they were all delivered to the Franklin County Children's Home. During the business portion of this meeting, C. E. Toothaker was elected delegate and R. J. Creamer, alternate delegate to the next annual convention.

January 15—On the educational program for the evening, J. E. Oliphant, representing Pierce Plastic Corporation, Bay City, Michigan, discussed the usefulness of Saran tubing. G. E. Graff contributed news pertaining to the materials situation. E. E. Eggleston, William Redd and Robert Creamer were appointed a Nominating Committee.

VIRGINIA CHAPTER

January 16—The meeting was called to order by President Lampie and the secretary's annual report was read, followed by the treasurer's report. Due to a change of position which would require his removal from the state, B. A. Hauck tendered his resignation which was accepted. F. J. Magri of Richmond, Virginia, was appointed by the president to fill the remaining term of the office of secretary.

YOUNGSTOWN CHAPTER

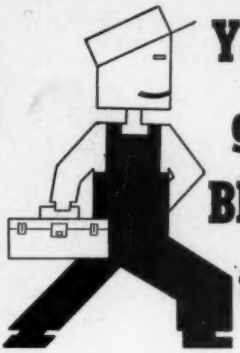
At a recent meeting of the chapter, new officers were elected as follows: Carl L. Dieter, *President* and Dallas Nutt was elected to serve in the combined offices of *Secretary and Treasurer*. Daniel Dawson was appointed *Sergeant-at-Arms*. Also, at this meeting a letter was drafted offering the services of the members to the civilian defense corps in case of emergency.

LOUISIANA CHAPTER

At a recent meeting of the chapter a letter was drafted which was later sent to the State Defense Co-ordinator, offering to the State Defense Board the services of the membership for any assignment. It was felt that in the event of an air raid emergency, members of the chapter who are familiar with toxic and non-toxic gases would be better equipped to take care of the handling of such gases where the release of these gases may cause explosions or other accidents.

PITTSBURGH CHAPTER

January 16—The meeting was held at the Fort Pitt Hotel and was one week later than the regular date. Paul Riddle was installed as president during the opening period of the meeting, then the minutes of the previous meeting were read and the correspondence read and filed. The secretary was instructed to write the Governor of the State, offering



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him the services of the chapter in case of emergency. Several committees were appointed by the president, including a Visiting Committee, an Entertainment Committee and a Membership Committee. Pictures were shown by Virginia Smelting Company following the meeting.

ONTARIO MAPLE LEAF CHAPTER

January 16—Ken Wood presided over the meeting and the roll call of officers showed a majority present. One of the first orders of business was the election of an assistant secretary. Bob Henderson was elected. Four new members were admitted to membership, then the president took up in detail some of the problems confronting the chapter at the present time. Among these problems was the gas rationing bill, which is about to be put into effect and along this line it was decided to ask each member to send in an affidavit covering his mileage from January 1st of last year to December 31st. Announcement was made that a service conference would be held on March 15 and 16 taking the place of the annual convention usually held at this time. The manufacturers' support would be sought and courtesy booths would be provided instead of the usual exhibit booths. The annual banquet and dance would be held on Monday, March 16. Five dollars in War Savings Stamps was given as the door prize and won by James Ferguson.

WORCESTER CHAPTER

December 16—Two guests of the evening were introduced by the president. They were Clarence Gaw and Edmond LaFlamme. The treasurer gave his annual report which showed a very nice balance in the treasury. His report was accepted by the chapter. It was announced that the planned speaker of the evening was unable to attend. Mr. Goddard of the Chamber of Commerce had intended to speak at this meeting, but due to defense meetings which were taking place at the same time, he was unable to attend.

January 6—Charles Harris of the Boston Chapter was a visitor for the evening and was introduced by the president. Bob Sheperdson spent some time in discussing OPM orders pertaining to refrigeration repair and maintenance. Mr. Sheperdson in his talk sounded a very optimistic note regarding the position of the refrigeration industry in the

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securing of parts. Captain Baker of the police department and Captain Kelleher of the local fire department were introduced and Captain Kelleher talked on auxiliary fire department assistants. He suggested that the group be given instructions and then split up to assist different stations to carry on the work. He explained that a class was soon to be started and that instructions would be given on Mondays, Wednesdays and Fridays. The chapter liked the idea and expressed themselves as in favor of going further into the work. Mr. Harris enlarged on Mr. Sheperdson's talk and added some additional information on the expected cut in production of commercial equipment.

MOTOR CITY CHAPTER

January 13—The meeting was called to order by E. Hansen in the absence of the president. There was a lengthy discussion regarding the cost of service calls and quite a variation of opinions was expressed. As a basis of further discussion the article appearing in THE REFRIGERATION SERVICE ENGINEER, entitled "Whither Are We Bound" was read by the secretary. Mr. Lifsey made the suggestion that a joint meeting with the Lansing Chapter and perhaps the Grand Rapids Chapter be arranged. It was felt that a combined meeting would attract a large attendance.

ROCKFORD CHAPTER

January 19—Among other business matters of the evening the subject of a donation to the Red Cross was brought up by A. Overman. A motion was made, seconded and duly passed that the chapter donate the amount of $5.00 for this worthy cause. The balance of the evening was devoted to business matters in the chapter.

SAN DIEGO CHAPTER

January 8—One of the first orders of business was the treasurer's report on the outcome of the dinner dance held on November 29. Apparently from the report it was a very successful affair financially. A motion was made and duly passed that a letter be sent to the Director of Civilian Defense in San Diego offering the cooperation of the chapter and its members in any manner in which it could be useful. The balance of the evening was taken up with the annual election of officers and those elected were as follows: *President*, Merle Pitts; *Vice-presi-*

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dent, Thomas Connors; *Secretary,* Wm. J. Fickler; *Treasurer,* A. E. Gardner; *Sergeant-at-Arms,* C. E. Anderson.

COLONELS CHAPTER

December 18—A committee consisting of Messrs. Mercer, Dicken and Tingle was appointed to secure accommodations for a dinner meeting to be held January 8. One of the provisions of the meeting was that prospective members were to pay for the dinner, but the amount would be allowed against initiation fees and dues if the balance was paid in thirty days. The annual election of officers resulted in the following: *President,* R. Atkinson; *Vice-president,* E. K. Tingle; *Secretary,* H. C. Moore; *Treasurer,* H. H. Shuell; *Sergeant-at-Arms,* J. H. King; *Board of Directors,* E. J. Dicken, Louis Head, H. C. Moore, H. H. Shuell, E. K. Tingle.

January 8—The meeting was preceded by a very enjoyable dinner. Fifteen were in attendance. During the business session, the secretary was instructed to write the Governor of Kentucky and Mayor of Louisville offering the services of the chapter in any emergency that may arise. The newly elected officers were then introduced and installed to office. Messrs. Lawson, of Louisville Mill Supply, and Hutchison, of S.W.H. Supply, discussed at some length priority ratings and the present day situation regarding materials.

January 22—At this meeting two of the members announced with regret their future inability to attend meetings. Both are entering government work and Mr. Shuell, in particular, resigned from his office as Treasurer due to the probability that he would be transferred out of the locality. Both members were extended the well wishes of the chapter and assured of continued membership if they wished it.

BOSTON CHAPTER

January 19—After some discussion the chapter voted to write the Department of Public Safety and offer the facilities of the Society in case of any emergency. The chapter voted to change its regular meeting night from Monday to the second Tuesday of each month. This change became necessary due to the fact that defense activities prevented many members from attending Monday nights. It was suggested and finally decided,

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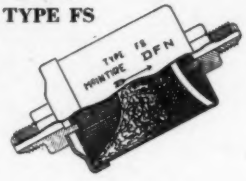

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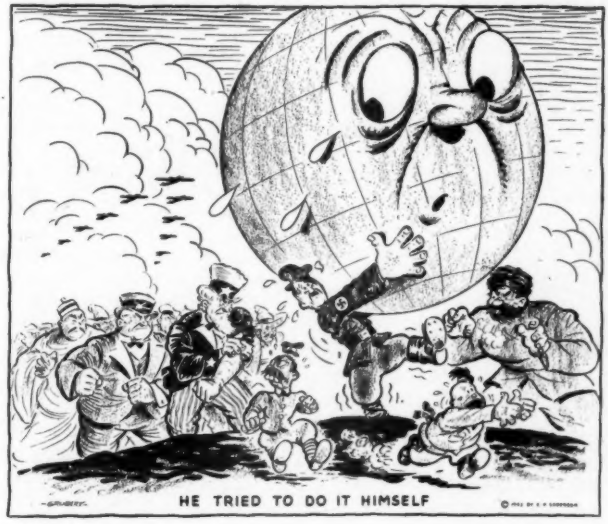
after some discussion, that the annual banquet be held on the second Tuesday of March at which time the new officers would be formally introduced.

SPRINGFIELD CHAPTER

January 14—The meeting was held at the U. S. Electric Company and presided over by President Potter. The Nominating Com-



AIRO RELEASES NEW CALENDAR

The fifth in its annual series of exclusive copyrighted cartoon calendars has just been released by Airo Supply Company, wholesale distributors of refrigeration and air conditioning parts, tools, and supplies.

Appropriately called the "Victory Calendar" it features the "He Tried To Do It Himself" cartoon. Following a patriotic trend, the calendar is red, white, and blue. At the top of the calendar is an American Eagle holding a "V" for victory in its claws.

The company offers to send a "Victory Calendar" to everyone in the refrigeration and air conditioning industry as long as the supply lasts. Requests should be addressed to Airo Supply Company, 2732 N. Ashland Ave., Chicago, Ill.

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mittee presented their report and the annual election of officers got under way. Those elected were as follows: *President,* J. K. Farrelly; *First Vice-president,* A. L. Hammond; *Second Vice-president,* Adolph Pasquale; *Secretary,* Kenneth Beatty; *Treasurer,* John Stoppelwerth; *Sergeant-at-Arms,* David Winters; *Board of Directors,* James W. Barnes, D. E. Greig, Wm. Andersen, F. W. Nichols. Immediately following the election the new officers were installed into office. The new president appointed J. J. Kline and R. M. Potter as an Auditing Committee, asking that they prepare their report for the following meeting.

Ladies Auxiliary

NIAGARA FRONTIER AUXILIARY

November 11—On this date a group of the ladies of Niagara Frontier Chapter met in the home of Mrs. John Bush for the purpose of discussing the matter of organizing an auxiliary. After a thorough explanation of the activities of the Auxiliary had been given those in attendance, all present filled out applications and received a copy of the constitution and by-laws. Several paid their dues. One of the first orders of business was the election of officers and those elected were as follows: *President,* Mrs. Wm. Goeckel; *Vice-president,* Mrs. Huey Keirn; *Secretary-Treasurer,* Mrs. Martin Bernstone; *Sergeant-at-Arms,* Mrs. John Bush; *Board of Directors,* Mrs. John Muller, Mrs. Ralph Davis, Mrs. Leon McCormick. It was decided that the auxiliary would hold regular meetings twice each month. A definite time and place, however, has not yet been decided. The social entertainment of this first evening consisted of games, for which there were prizes and refreshments.

December 9—The second meeting of the auxiliary took place in the home of Mrs. Goeckel. During the discussion of the future activities of the auxiliary, war relief work or Red Cross work was suggested and Mrs. Bush said she would investigate. Entertainment consisted of games, prizes and a delicious buffet supper prepared by Mrs. Goeckel.

January 6—The meeting was held in the home of Mrs. H. Keirn. In reporting on her investigation of Red Cross work, Mrs. Bush announced that any member who so wished could help this cause individually. Supper was served by the hostess and an entertaining period of games followed with prizes offered for the winners.

TOM PLOUFF BACK IN HIS OLD TERRITORY

LEONARD WRIGHT, JR., Ansul Chemical Co. district manager for their north-central territory, has recently been called to the service of his country. Because of his experience and familiarity with this territory, Tom Plouff is returning as its manager, being transferred from the position of Assistant Sales Manager for the Dugas Engineering Co., a dry powder fire extinguisher company, owned and operated by Ansul Chemical Co. Mr. Plouff and his wife and two fine boys will make their home in Des Moines, Iowa.

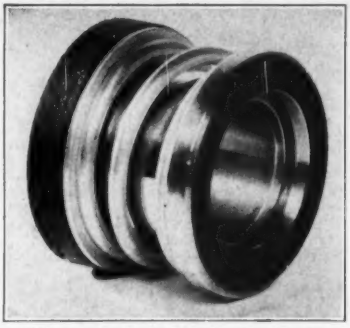
S S S

FREEDLANDER APPOINTED TO RUBBER DIVISION OF OPM

A. L. FREEDLANDER, President and General Manager of The Dayton Rubber Manufacturing Company, Dayton, Ohio, was appointed Deputy to the Chief of the Rubber and Rubber Products Division of the Office of Production Management on December 26th. Freedlander has been in the rubber industry for twenty-eight years.

A. L. FREEDLANDER

Leaving the development division of one of the large Akron companies twenty-two years ago, he joined Dayton Rubber in the capacity of Factory Manager. Several years later he was made Vice President, and became President and General Manager in 1936. Mr. Freedlander is credited with a long list of developments in rubber chemistry, engineering and manufacture. He served the Government during the first World War.



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NEW CATALOGS AND BULLETINS

PENN ELECTRIC SWITCH CO., Goshen, Indiana, has just issued its 1942 condensed catalog on refrigeration and air conditioning controls. In addition, it has issued a new bulletin containing complete information on refrigeration controls with calibrated dials.

The catalog is an attractive two-color, sixteen-page book containing a complete listing of all controls. The book is well illustrated and provides applications, features, specifications, ordering information, and various other data relative to ordering.

The bulletin containing six pages covers the company's 1265 series controls for pressure and temperature applications, featuring accurate positively-geared calibrated dials.

Both of these releases by the Penn Electric Switch Company are conveniently punched so that they may be combined in any of the common loose-leaf binders in use.

Copies of both the catalog and the bulletin are available now. Write the Penn Electric Switch Company direct.

AUTOMATIC PRODUCTS CO., 2450 North 32nd Street, Milwaukee, Wisconsin, has distributed a new circular designed to show the effectiveness of "Trap-It." The circular shows a "Trap-It" which has done an exceptional job of collecting various foreign materials circulating in a refrigerating system. It goes on to show that the saboteurs of commercial refrigeration are scale, gummy deposits, moisture, and metal filings.

"Trap-It," through its large filtering area does a very effective job of removing these deposits and by so doing, eliminates many troubles and saves many dollars in spoilage of foods and loss of time.

DAY & NIGHT MANUFACTURING CO., 2320 East 8th Street, Los Angeles, California, has just issued Bulletins No. 46 and 47, covering the various types of water coolers and drinking fountains manufactured by them.

Bulletin No. 46 provides specifications on all the various coolers, and it is interesting to note that on Page 2 of the bulletin, two coolers are listed, designed especially for use on shipboard and for the Navy. It contains six pages in all and covers coolers from the small office type to the large industrial and processing type of cooler.

Bulletin No. 47 announces a new installation service for condensing unit manufacturers, jobbers and distributors being provided by the company. It also lists various

accessories such as thermostatic expansion valves, thermostats and driers and strainers used on their systems. The last page of the bulletin is devoted to prices for installations, services, accessories, valves and controls.

AUTOMATIC HEATING & COOLING SUPPLY CO., 647 W. Lake St., Chicago, Illinois, has just released the 1942 edition of their annual catalog. They state that in addition to all of the standard lines that have been shown previously, a number of new lines for the refrigeration and air conditioning industry have been added.

Wholesalers to the Refrigeration and Air Conditioning Industry.....
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